Local
Wash

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Index to Subjects

	Issue and Page
Accident Prevention	
Accident, Fire and Carelessness	Mar., 66
"So Far in 1933"	July, 15
Real Swimmers Seldom Drown	Aug., 15
See also Fire, Grade Crossings, Police Traffic	
Accounting, Municipal—See Finance	
Advertising, Municipal	
Legal Advertising in Newspaper	May, 71
Truck with Trade Union Placards	Nov., 73
Airports and Aviation	
Buffalo Has A-1-A Airport	Jan., 11
Miami's System of Airports	Jan., 63
Airports and Landing Fields in U. S.	Feb., 11
Airport Beyond Municipal Limits	Feb., 79
Canada Building Flying Fields	Mar., 11
Development of the Boston Airport	Apr., 51
Double-ended Rotating Beacon	Aug., 11
Airport Outside City Limits	Sept., 81
Two-Way Intermediate Landing Field	Nov., 11
Annexation to City	
Statutory Authority for Annexation	Jan. 84
Territory in Adjoining County	Apr., 75
Annexing Part of River	Dec., 75
Art and Architecture	
Lincoln Statue, Wabash, Ind.	Feb., cover, 75
An Architectural Water Tank	Mar., 54
Assessments	
"Foot Front" Rule of Assessment	Apr., 75
Sewer for Opposite Side of Street Bounding City	May, 71
Non-joinder by Affected Owners	May, 71
Compulsory Re-assessment	May, 71
Land Adjoining Excess Strip	May, 71
Lots in Triangular Block	May, 71
Defects in Sidewalk Construction	May, 71
Payment of Installment for Sewer	June, 76
Maturing All Annual Installments on Delinquency as to One	June, 76
Metropolitan District Water Main	June, 76
Street Improvement Not White Way Lighting	Sept., 81
Assessing State Lands for City	Sept., 81
Storm-Sewer Assessments	Oct., 56
Resisting Payment, for Non-Consent	Oct., 71
Front Footage and Area Combined	Oct., 71
Payment in Paving Bonds	Oct., 71
Delinquent Special Assessment Not Certified to Treasurer	Oct., 71
See also Finance	

	Issue and Page
Auctions	
Ordinance Limiting Jewelry Sales	Apr., 75
Auctioneer in Local Business a Year	Aug., 69
$1,000 Tax Against Jewelry Auctioneers	Oct., 71
Auditoriums—See Buildings	
Aviation—See Airports	
Beaches	
Beach Playground, Los Angeles	Mar., 64
Yacht Anchorage and Beach, Santa Barbara, Calif.	May, cover
Beautification	
Beauty and Peace for the Living	Aug., 52
"Before and After" Pictures	
Feb., 68, 69, 70; Mar., 88; April, 90; June, 11; July, 60; Aug. 38; Nov., 91	
Billboards and Signs	
Fall of Defective Billboard	Jan., 84
Hazardous Scheme for Safety	May, 19
Dental Sign Forbidden	July, 61
See also Traffic	
Bond Issues—See Finance, Municipal Bond Market	
Boulevards—See Streets	
Bridges and Viaducts	
Viaduct, Jersey City—Newark	Jan., cover, 102
Municipal Toll Bridge over River	Jan., 84
Rigid Frame Bridge, Los Angeles	Feb., 57
Old and New in Culverts	June, 11
High-Level Bridge, Hamilton, Ont.	June, 95
New Bridge at Albany, N. Y.	Aug., 11
Repairing State and County Bridges	Oct., 47
Bridge and Viaduct, Westfield	Oct., 87
Concrete Bridge Beautifies Park	Dec., 66
See also Streets	
Buildings, Public	
St. Paul City Hall and Courthouse	Jan., 79
Lease of Municipal Music Hall	Jan., 84
Surroundings, City Hall, Newton	Jan., 86
Modern Police Station	Mar., 65
Liability for Injury, Fall on Steps	Mar., 72
Boxing Exhibition, Public Gymnasium	Mar., 72
Restoring, or Replacing, Courthouse	Mar., 72
Auditorium, Long Beach, Calif.	Apr., cover, 63
Modern Fire Station, Two Rivers	Apr., 64
Modern Form of Greek Theater	Apr., 65
Town Hall, Longmeadow, Mass.	Sept., 51
Community Hospital, Huntington, N. Y.	Nov., 61
City May Rent Municipal Hall	Dec., 75

	Issue and Page
Injury to Pipe Organ of Lessee	Dec., 75
Cartoons	
Better Traffic Campaign, Pittsburgh	Apr., 66
He Played in the Street	June, 17
Chamber of Commerce Activities in Public Affairs—See Civic and Commercial Organizations	
Charities	
Reimbursement of City by Husband	Feb., 79
See also Unemployment	
Charters—See Government	
Child Welfare—See Health, Recreation, Schools	
City and Regional Planning, Replanning and Zoning	
Fair Play in Paying for Improvements	Jan., 71
Missouri Planning Conference	Feb., 56
Zoning as Basis for Assessment	Feb., 65
Benefits of Town and County Planning	Feb., 69
Fifteen Present-Day Points	Feb., 77
Official Plan, Measure of Economy	Mar., 51
Fair Ground, Recreation Center	Mar., 52
A Protected Trafficway	Mar., 59
Free Public Lectures on Planning	Apr., 62
Treatment of Arterial Parkways	May, 36
"The Future Is to the Planners"	May, 42
Santa Barbara, Calif., Builds	May, 58
Teaching Planning in the Schools	May, 62
Highway Planning for Counties	June, 50
Fire Safety Provisions	June, 55
Real Estate Valuation Trends	June, 71
McKeesport Plans for the Future	June, 71
Major Highways, New York Region	July, cover
A New Deal for Planning	July, 5
Express Highways, New York Region	July, 40
Citizens Must Cooperate	July, 52
Rehabilitating Uneconomic Districts	Aug., 62
Boulevard Planning, L. I. City	Aug., 63
Essentials for Future City Growth	Sept., 40
Chart That Tells Its Own Story	Sept., 44
Zoning of Breweries, Distilleries	Sept., 62
"Greater Paris"	Sept., 63
The City of Medium Size in Future	Sept., 66
Land Economics School	Sept., 68
Challenge to City of Medium Size	Oct., 67
Suburbanism "Come of Age"	Oct., 67
How Shall Breweries Be Zoned?	Nov., 41
Challenges to Planners	Nov., 45

City and National Planning Merge — Nov., 65
Relation Between Large and Small Cities — Dec., 64
Mr. Klaber's Rebuttal — Dec., 64
Federal Funds for Local Planning — Dec., 73
See also Housing, Zoning and Planning Notes

City Beautification—See Beautification

City Manager Appointments
Feb., 75; Apr., 65; May, 64; June, 73; July, 43; Aug., 67; Sept., 67; Nov., 63; Dec., 66

City Manager Plan
Petition to Abolish Office — Feb., 79
Cities Meeting Their Obligations — May, 60
Managers Hold Successful Convention — Oct., 77

City's Legal Rights and Duties—See Legal Decisions

Civic and Commercial Organizations and Their Work
Campaigns for Better Housing — Feb., 58
Work for Government Economy, Tulsa — Feb., 67
Promoting Water Improvements — Oct., 7
Chamber of Commerce, Scouts, NRA — Nov., 62
For other activities of civic and commercial organizations, see also practically every subject heading

Civil Service
Removal for Economy, and New Appointment — Jan., 84
Reinstatement of Policeman — Feb., 79
Dismissal of Discharged Soldiers — Feb., 79
Workhouse Chef Instead of Steward — Mar., 72
Judicial Review of Policeman's Removal — Mar., 72
Policemen Removed without Notice — July, 61
Veteran Preferred as Fireman — Sept., 81
Removal of Police and Fireman: Shortage of Funds — Sept., 81
Janitor Not Protected — Nov., 73
Policeman Removed without Defense — Dec., 75
Veteran's Preferred Right to Office — Dec., 75

Cleaning, City—See Clean-up Campaigns, Street Cleaning

Clean-up Campaigns
Eliminate Weeds — July, 60

Commission-Manager Plan—See City Manager Appointments

Condemnation of Land—See Land Condemnation

Conferences, Conventions and Exhibitions
Jan., 89; Feb., 82; Mar., 49, 77; Apr., 81; May, 5, 77; June, 81; July, 71; Aug., 47, 73; Sept., 70, 87, 93; Oct., 50, 62, 77; Nov., 77; Dec., 79

Conservation
Iowa Conservation Plan — June, 73

Contracts
Penalty for Breaking Contract — Jan., 84
Indefinite Contract for Engineering — Jan., 84
Thickness of Concrete Paving — Feb., 79
Local Hand Labor for Sewers — Apr., 75
Failure to Sign Sewer Contract — Apr., 75
Engineering Services on Street Work — Apr., 75
Bidding Specifications Refused — Apr., 75
Award without Competitive Bidding — May, 71
Insufficient Printing Specifications — May, 71
Engineer's Unauthorized Contract — May, 71
Subsidence of Street Surface — May, 71
Newspaper Advertising: Referendum — May, 71
Defective Sidewalk Construction — July, 61
No Award to Lowest Bidder — July, 61
No Specifications for Bidding — July, 61
Street Contractor's Negligence — Aug., 69
Deficit in Special Assessments — Aug., 69
No Competitive Bidding: Printing — Aug., 69
Award without Competition — Aug., 69
Notification to Successful Bidder — Aug., 69
No Proper Competition: Power Plant — Aug., 69
Contract for Engineering, Void — Nov., 73
Commissioner Interested in Contract — Nov., 73
City's Agreement to Dredge Channel — Dec., 75
Competitive Bids Not Invited — Dec., 75
Special Contract with City Electrician — Dec., 75

Conventions—See Conferences

Courts
Repeal of Ordinance Establishing City Court — Jan., 84
See also Police

Crime and Prisons—See Police

Drainage
Anticipating Probable Rainfall — Aug., 69
Culvert Obstructed Natural Flow — Nov., 73
Negligent Maintenance of System — Nov., 73

Dust Prevention—See Street Cleaning

Elections
To Authorize Water District Bonds — Jan., 84
Influencing Electors' Vote — Apr., 75
Election on Proposed Water System — June, 76
Time of City Election; No Notice — July, 61
Plurality Elects — Nov., 73
Public Utilities in Recent Elections — Dec., 75

Employment—See Unemployment

Engineering, Municipal and County
High Towers Aid Survey, Detroit — Jan., 81
Authority vs. Responsibility — Mar., 11
On Street Improvement Project — Apr., 75
Engineer's Unauthorized Contract — May, 71
Contract for Engineering Service — Nov., 73
See also City and Regional Planning, Outdoor Lighting, Power Plants, Public Works, Streets, Water Supply, Who's Who

Exhibits—See Conferences

Expositions—See Conferences

Fees—See Licenses

Filling Stations
License Tax Not Unreasonable — Feb., 79
Partial Removal of Parkway — June, 76
Coin-in-Slot Pumps Forbidden — July, 61
$24 Annual License Fee Valid — Aug., 69
Gasoline Storage Tax Upheld — Oct., 71
See also Zoning and Planning Notes

Finance, Accounting and Taxations
Balancing the Depression — Jan., 5
R.F.C. Reduces Interest Rates — Jan., 5
Accelerating Self-Liquidating Works — Jan., 5
Self-Liquidating Loans — Jan., 5; Feb., 5; Mar., 5; Apr., 5
A View of Governmental Spending — Jan., 49
Federal Aid to States and Cities — Jan., 54
Cities' Share of State Taxes — Jan., 62
Fair Play in Paying for Improvements — Jan., 71
Financial Reorganization, Johnstown — Jan., 80
Appropriations for Fire Department — Jan., 84
Contract for Audit of City Accounts — Jan., 84
Reissue of City Bonds Before Maturity — Jan., 84
Limiting Power to Incur Debt — Jan., 84
Treasurer's Omission to Give Bond — Jan., 84
Payment of Overdue Bond Interest — Jan., 84
Superiority of One Tax Lien — Jan., 84
Tax on Masonic Temple Building — Jan., 84
Banker Control of City Expenditures — Jan., 84
Over-Subscription on Treasury Notes — Jan., 84
Are Local Expenditures Excessive? — Feb., 59
Elimination of Waste True Economy — Feb., 63
Zoning Basis for Assessment — Feb., 65
Use Gas Tax for Roads Only — Feb., 66
Slum Clearance and Land Values — Feb., 78
Conveyance of School Property — Feb., 79
Municipal Contract to Buy Realty — Feb., 79
Right to Attack Assessment Lien — Feb., 79
"The Country Can Afford to Pay" — Mar., 5
Tax May Be High Yet Not Wasteful — Mar., 5
Clear Thinking on Public Spending — Mar., 39
Taxes Paid by Motorists — Mar., 48
Official City Plan for Economy — Mar., 51
Newspaper Cooperation for Economy — Mar., 58
Benefits of a Tax Map — Mar., 60
New School, Lower Taxes, No Pay Cuts — Mar., 61
Fees Deducted from Tax Collections — Mar., 72
County Land Not Taxable by City — Mar., 72
Tax Against Water-Works Property — Mar., 72
Tax Report Scores False Economy — Apr., 5
Citizens' Councils—Wise Spending — Apr., 40
Shall We Balance Budgets or Minds? — Apr., 50
High Tax-Paying Ability Preferable — Apr., 59
Novel Sewer Financing — Apr., 60
Cost Accounting—Sanitation — Apr., 61
Bonds Unissued When Act Was Adopted — Apr., 75
Suit to Compel Interest on Bonds — Apr., 75
Conflicting Dates of Bond Maturity — Apr., 75
Lack of Authority to Issue Bonds — Apr., 75
Bonds Payable in Lawful Money — Apr., 75
Bond Proceeds Invested in Other Bonds — Apr., 75
Invalid Special Assessment Bonds — Apr., 75
Proceeds of Municipal Utility Sold — Apr., 75
State Tax on Gasoline Used by Cities — Apr., 75
Social Workers Discuss Public Works — May, 42
Kansas Cities to Work on Cash Basis — May, 50
Costs per Person for City Services — May, 50
Citizens' Councils Urged — May, 57
City Manager Cities' Obligations — May, 60
Changing Slums into Parks — May, 69
Bond Interest Funds Not Divertible — May, 71
City Tax on Gasoline Sales Upheld — May, 71
Imprisonment of Delinquent Taxpayer — May, 71
Federal Aid for Public Works, etc. — June, 5
Taxes and the Little Old Home Town — June, 58
Municipal Enclave of Economic Rent — June, 58
Tax-Gatherers vs. Budget-Slashers — June, 61
Real Estate Valuation Trends — June, 71
Sales Tax Laws Unconstitutional — June, 72
Michigan Limit; Home Rule Cities — June, 72
New York Abolishes Personal Property Tax — June, 72
Outstanding Sewer Warrants — June, 76
Mayor, Clerk, Officers of Depository — June, 76
Installment Payment for Plant Equipment — June, 76
Treasurer Neglects Tax Collection — June, 76
Liability of Non-Appealing Taxpayer — June, 76
R. F. C. Fades Out of Public Works Picture — July, 5
Road Work for Delinquent Taxes — July, 11
Financing a Sewer District — July, 13
Federal Loans and Grants Available — July, 35
Charges for Treating Trade Wastes — July, 45; Aug., 44
Baltimore's Tax Savings Plan — July, 59
City's Claim on Insolvent Bank — July, 61
Veterans' Exemption from Taxation — July, 61
Statute Limiting Tax Levy — July, 61
Municipal Debts; Tax Delinquency — Aug., 35
Collecting Delinquent Taxes — Aug., 36
Financing Sewerage Works — Aug., 40
Values, Publicly Used Property — Aug., 54
Massachusetts Audits Municipalities — Aug., 64
Bonds Issued Violating Injunction — Aug., 69
Assessment for Flood Control — Aug., 69
Revenue Bonds for Sewerage, Water — Sept., 61
Applying for Federal Aid for Public Works — Sept., 71
Refunding, Not Paying, Bonded Debt — Sept., 81
Bonds for Electric Light Equipment — Sept., 81
Town Gets Half of Road Tax — Sept., 81
County Liable to Town for Failure to Collect Taxes — Sept., 81
Federal Highway Funds for Streets and Bridges Within City Limits — Oct., 11
The Crisis in the Property Tax — Oct., 39
British System of Local Taxation — Oct., 40
A Rejoinder by Professor Griffith — Oct., 41
Broadcasts on Municipal Finance — Oct., 41; Nov., 48
Citizens to the Rescue — Oct., 42
Grants to Cities for Public Works — Oct., 58
NRA Codes; Municipal Tax Rates — Oct., 60
Local Governmental Costs — Oct., 66
Over-the-Counter Sale of Bonds — Oct., 68
Financial Distress; Bond Payment — Oct., 71
Warrant on Insolvent Bank — Oct., 71
Mandamus to Compel Tax to Pay Bond — Oct., 71
Bonds for Poor Relief — Oct., 71
Non-Exemption from Poll Tax — Oct., 71
Excise Taxes on Municipal Light Plants — Oct., 71
Receivership for Tax Delinquents — Nov., 41
The Menace of Tax Limitations — Nov., 56
Comment on Griffith-Adams Debate — Nov., 65
Expensive Public Economy — Nov., 65
How Tax-Paying Pays the Tax-Payer — Nov., 66
Legislative Requirements for Making Federal Funds Available — Nov., 68
Improving Municipal Accounting — Nov., 77
Bonds and Coupons for Tax Payments — Nov., 73
Return of Deposit for Illegal Bonds — Nov., 73
Plant Revenues to Pay for Power Plant Equipment — Nov., 73
Levying Taxes to Pay Prior Debts — Nov., 73
Street Tax on Motor Carriers Void — Nov., 73
Competitive Bidding for Audits — Dec., 44
Tax-Paying Drive — Dec., 58
Assessing for Drainage — Dec., 75
Non-Benefiting Street Improvement — Dec., 75
Cost of Street Signs — Dec., 75
City's Right to Claim Lien — Dec., 75
Taxpayer's Suit for Mandamus — Dec., 75
See also Licenses, Municipal Bond Market, Salaries

Fire Prevention and Control
Training Course, Oklahoma Cities — Jan., 19
Fire Department's Educational Show — Jan., 81
Negligent Driving of Fire Truck — Jan., 84
Ordinance for Appointment of Firemen — Jan., 84
Fire-Prevention Week Results — Feb., 19
Panicky Economy — Feb., 19
Fire Departments in 236 Cities — Feb., 72
Charlotte's Fire Department's Work — Mar., 19
In Canton, Ohio — Mar., 66
Fire Alarm, Newton, Mass., City Hall — Mar., 67
Fire Training in New York State — Apr., 19
Fire Drills by Floodlight — Apr., 19
Old Fire House Superseded — Apr., 64
Winners in Fire Waste Contest — May, 19
Why Save in Fire Prevention? — May, 59
A Fire Pumper Afloat — May, 64
Lowering Fire Losses — June, 17
In Ridgewood, N. J. — June, 43
Fire Safety Provisions Help Sell City Planning and Zoning — June, 55
Negligent Operation of Fire Truck — June, 76
Compelling Public Attention — July, 15
Coin-in-Slot Gasoline Pumps — July, 61
Contract for Fire-Alarm Boxes — July, 61
How to Secure Better Facilities — Aug., 15
Aids for Fire Prevention Week — Sept., 17
Charges for Fire Protection — Sept., 48
Negligent Operation of Fire Truck — Sept., 81
Raising the Standards of the Fire-Fighting Profession — Oct., 17
Applying Lessons from Fires — Nov., 17
Threefold Task of Arson Squads — Dec., 54

Flood Protection and Damage
Concrete Wall Protects City — Aug., 42
Assessments for Flood Control — Aug., 69

Forestry
Don't "Economize" in Care of Trees — Feb., 53
Designed Spacing of Street Trees — June, 54
Memorial Gift of Magnolia Trees — June, 54
Street Trees of Tokyo, Japan — Sept., 59

Forward Steps
Jan. 79; Feb., 67; Mar., 64; Apr., 63; May, 61; June, 70; July, 59; Aug., 63; Sept., 63; Oct., 65; Nov., 61; Dec., 65

Gambling Machines
Interfering with Entrance of Patrons — June, 76

Garbage Collection and Disposal—See Waste Collection

Government and Administration, Municipal and County
"You and Your Government"—Radio — Jan., 53
Home-Rule County Manager Charter — Jan., 69
The Reorganization of Johnstown — Jan., 80
Oklahoma's Radio Talks—Government — Jan., 86
Elimination of Waste—Economy — Feb., 63
Essential Services Must Go On — Feb., 65
Business Seeks Protection — Feb., 66
Tulsa Chamber Works for Economy — Feb., 67
Petition to Abolish Manager's Office — Feb., 79
Civic Radio Education, Virginia — Mar., 44
City Charter Modernization — Apr., 40
Curing Slums and Blighted Areas — Apr., 48
Radio Broadcasts, New York State — Apr., 68
To Study German City Government — May, 38
Better Training of Public Servants — May, 57
City-County Consolidation, Durham — May, 62
Good Men; Bad Machinery — June, 67
Consulting and Research Service — July, 43
"Listen and Learn"—Government — July, 67
City Reports by Radio — Aug., 64
Detachment of Unplatted Lands — Aug., 69
Annexation without Notice — Sept., 81

Issue and Page

Pending Annexation Proceedings ... Sept., 81
United States Conference of Mayors ... Oct., 50
Home Rule for Texas Counties ... Oct., 65
A Sympathetic Street Department ... Nov., 61
Citizen Support Essential ... Dec., 53
See also City Manager Appointments, Municipal Offices

Grade-Crossing Elimination
Certain Items Not Recoverable by Abutters as Damages ... June, 76
More Elimination Advocated ... Dec., 70

Health
Campaigning for Good Teeth ... Mar., 62
Anti-Tuberculosis Fight Essential ... Mar., 62
National Health Conservation Contest ... May, 45
Discontinuing Sewer Service to Milk Plant ... July, 61
Housing Congestion ... Dec., 49

Highways—See Streets

Hospitals—See Buildings

Housing
Obsolete Housing Revealed ... Jan., 86
Legislation for Low-Cost Housing ... Feb., 5
$5,000,000,000 for Public Works and Housing? ... Feb., 43
Civic Club Campaigns for Housing ... Feb., 58
Baltimore's "Lung Block" Replaced ... Feb., 68
Slum Clearance and Land Values ... Feb., 78
Traveling Exhibit of Housing Projects ... Mar., 49
Why Stay in Covered-Wagon Era? ... Mar., 50
"Modernize Your Home" Plan, Elmira ... Mar., 65
Housing a Public Utility, New Jersey ... Apr., 5
$8,000,000 Loan for Slum Clearance ... Apr., 5
Charter Provisions for Curing Slums ... Apr., 48
States Eligible for R.F.C. Loans ... May, 5
"Housing and Economic Recovery" ... May, 5
Federal Aid for Housing ... June, 5
The Menace of Outworn Dwellings ... June, 69
Housing Survey, Delaware ... June, 75
Housing Features of the NIRA ... July, 5
Housing a Major City Opportunity ... Aug., 37
Housing Division Organized ... Aug., 67
Projects Approved for Federal Aid ... Sept., 73
Have We a Housing Surplus? ... Oct., 63
"Housing Authority" Law, Ohio ... Oct., 63
Uncle Sam to Build Houses ... Nov., 5
Housing Projects Approved by PWA ... Nov., 5
Housing Study Guild Organized ... Nov., 67
Slums and Blighted Areas ... Nov., 67
Housing Congestion; Health ... Dec., 49
National Association, Housing Officials ... Dec., 71
Federal Emergency Housing Corporation ... Dec., 72
See also City Planning

Land Condemnation
Changing Use of Condemned Land ... Mar., 72
Owner Failed to Prove Damage Claim ... July, 61
Payment of Condemnation Award ... Dec., 75

Law, Municipal—See Legal Decisions, Ordinances

Legal Decisions
Jan., 84; Feb., 79; Mar., 72; Apr., 75; May, 71; June, 76; July, 61; Aug., 69; Sept., 81; Oct., 71; Nov. 73; Dec., 75.
Employment of Private Attorney ... Jan., 84
Value of Legal Services under Invalid Contract ... Jan., 84
Peddlers Forbidden to Enter ... June, 76
Title to Public Land by Occupancy ... June, 76
Damage to Private Beach Property ... Aug., 69
Ordinance Forbidding Fake Sales ... Aug., 69
Judge's Decision Falsely Impugned ... Sept., 81
Petition Signed on Separate Sheets ... Sept., 81
Sale of Ice Manufactured Outside City ... Nov., 73
Solicitors Forbidden to Enter ... Dec., 75
Marks on Milk Bottles ... Dec., 75

Legislation Affecting Municipalities
Expense for Promotion of City Interests ... Feb., 79
Fixing Pay of Probation Officers and Local Health Registrar ... Oct., 71
See also Ordinances

Letters to the Editor
Feb., 78; May, 60; Oct., 66, 67; Nov., 41, 65

Liability, City and County and Officials'
Fall of Defective Billboard ... Jan., 84
Explosion, Gasoline Tank, Street-Grading Machine ... Jan., 84
Negligent Driving of Fire Truck ... Jan., 84
Legal Service under Invalid Contract ... Jan., 84
Contract Broken by County ... Jan., 84
Defective Drain Cover ... Feb., 79
Sloping Sidewalk Worn Smooth ... Feb., 79
Stakes Left Near Sidewalk ... Feb., 79
Sewerage Discharge from Permanent Outlet ... Feb., 79
Depreciating Rental Value by "No Parking" Signs ... Mar., 72
Fall on Steps of City Building ... Mar., 72
Neglect of Street Lighting ... Mar., 72
Drowning in City Swimming Pool ... Mar., 72
Auto Collision with Traffic Post ... Mar., 72
Auto Striking Fire Hydrant Post ... Mar., 72
Defective Water-Meter Lid ... Mar., 72
Pedestrian Ignoring Safer Course ... Mar., 72
Railroad Crossing Signal in Street ... Mar., 72
Dam's Depreciation of Nearby Property ... Apr., 75
Unwholesome Domestic Water Supply ... Apr., 75
Driving Trespassing Cattle from Unfenced Watershed ... Apr., 75

Issue and Page

Contract Awarded without Competitive Bidding ... May, 71
Fire Spreading from Dumping Ground ... May, 71
Money Judgment Against Golf Course ... May, 71
Judgment Against Property Needed for Public Purposes ... May, 71
Statute Governing Set-Off of Claims ... May, 71
License Wrongfully Refused ... May, 71
Treasurer's Payment of Warrants in Proper Form ... May, 71
Compulsory Street Re-Assessment ... May, 71
Condemnation by City of Right to Lay Water Mains ... May, 71
Negligent Operation of Fire Truck ... June, 76
Sidewalk Defects ... June, 76
Separation of Grades ... June, 76
Overflow from Drain ... June, 76
Insufficient Sewer-Drainage System ... June, 76
Inadequate Provision for Damages for Street Improvements ... June, 76
Treasurer's Neglect, Tax Collection ... June, 76
Slipping on Painted Traffic Mark ... July, 61
Unguarded Highway Embankment ... July, 61
Extra Compensation Illegally Received by Clerk ... July, 61
No Damages for Non-Abutter ... July, 61
Abutter Reinvested with Title to Land in Vacated Street ... July, 61
Injury to Boy Playing on Dump ... Aug., 69
Street Contractor's Negligence ... Aug., 69
Fall of Private Building Wall ... Aug., 69
Misuse of Merry-go-round in Park ... Aug., 69
Deficit in Special Assessments for Paving ... Aug., 69
Printing Ordered without Bidding ... Aug., 69
Contract Awarded without Competition ... Aug., 69
Land Depreciation by Sewage Plant ... Aug., 69
Sewage Disposal Nuisance ... Aug., 69
Care to Make Streets Safe ... Aug., 69
Unlighted Silent Policeman ... Sept., 81
Negligent Operation of Fire Truck ... Sept., 81
Toboggan Slide in Park ... Sept., 81
Neglect of Official Duties ... Sept., 81
Salary Paid to Usurper of Office ... Sept., 81
Unlawful Arrest ... Sept., 81
Defective Sewer ... Sept., 81
Flooding of Private Property ... Sept., 81
Discharge of Sewer into Creek ... Sept., 81
Failure to Collect Taxes ... Sept., 81
Warrant Drawn on Insolvent Bank ... Oct., 71
Canning Company's Sewage Nuisance ... Oct., 71
Sewage Discharge into Creek ... Oct., 71
Sewage Pollution of Fish Hatchery ... Oct., 71
Failure to Certify Delinquent Assessments ... Oct., 71
Diverting Use of Parkway ... Oct., 71
Deprivation of Access ... Oct., 71
Repair of Sidewalk Across Parkway ... Nov., 73
Fall of Wall Standing After Fire ... Nov., 73
Tripping on Ledge in Sidewalk ... Nov., 73
Death of Bather in Municipal Pond ... Nov., 73
Slimy Condition of Sidewalk ... Nov., 73
Maintenance of Streets, Sidewalks ... Nov., 73
Culvert Obstructing Natural Flow ... Nov., 73
Negligent Maintenance of Drainage ... Nov., 73
Injury to Pipe Organ of Lessee of Auditorium ... Dec., 75
Drilling Oil Wells in City ... Dec., 75
Failure to Construct Retaining Wall ... Dec., 75

Libraries
Occupation Tax on Branches ... Oct., 71
Public Library to the Rescue ... Dec., 63

Licenses and Fees
Peddlers of Perishable Products ... Jan., 84
Business Seeks Protection ... Feb., 66
Music and Dancing in Restaurant ... Feb., 79
Wholesale Baker's Agent Not Peddler ... Feb., 79
$1,500 Weekly Fee for Carnival ... Feb., 79
License Tax on Filling Stations ... Feb., 79
Non-Resident Merchants ... Mar., 72
Transient Merchants ... Mar., 72
Business within 3 Miles of Limits ... Apr., 75
Wholesale Dealers in Fruits ... May, 71
Peddlers' License Ordinance ... May, 71
Retail Coal Dealers ... May, 71
Chiropracter without State Certificate ... May, 71
Maximum Fees for Transient Merchants ... May, 71
Bus Company Fee Not Imposed ... May, 71
License Wrongfully Refused ... May, 71
Exemption of War Veterans ... June, 76
Registration of City Motor Vehicles ... June, 76
Regulation of Intercity Busses ... June, 76
Unlicensed Driver in Accident ... July, 61
Interurban Sightseeing Busses ... July, 61
Amplifying Radio Sounds into Street ... July, 61
Club Operating Bowling Alleys ... July, 61
Taxicab License Obtained by Fraud ... July, 61
Discrimination Against Non-Residents ... Aug., 69
$24 Annual License, Filling Stations ... Aug., 69
Auctioneer in Local Business a Year ... Aug., 69
Montana Counties Use License Fees for Roads ... Sept., 11
Carrying Passengers for Hire ... Sept., 81
Transient Photographers ... Oct., 71
Gross Profits Tax, Telegraph and Telephone Companies ... Oct., 71
Purchase of Electricity, Gas, Water ... Oct., 71
Gasoline Storage Tax ... Oct., 71
Occupation Tax, Branch Libraries ... Oct., 71
$1,000 Tax, Jewelry Auctioneers ... Oct., 71

Lighting, City and Street—See Outdoor Lighting

Liquor Problem
Breweries and Distilleries a Zoning Problem ... Sept., 62

Issue and Page

Lest We Try to Drink Ourselves into Law-Abiding Prosperity ... Nov., 35
How Shall Breweries Be Zoned? ... Nov., 41
State Alcohol Authorities Proposed ... Nov., 43

Manufacturers' and Contractors' Items—See News and Illustrations

Manufacturers' Literature
See p. 19, each issue.

Markets
Changed Use of Condemned Land ... Mar., 72
Referendum on Land Purchase for Market ... Mar., 72
Public Market in Street ... Dec., 75

Memorials
Magnolia Trees as a Memorial ... June, 54
George Washington Memorial Parkway ... Nov., 77

Methods, Materials and Appliances—See News and Illustrations

Motion Pictures
Injunction Against Sunday Movies Denied ... Mar., 72
State Law Banning Sunday Labor ... June, 76

Motor Equipment
Street Maintenance, Houston, Texas ... Jan., 49
Street Cleaning, Jackson, Miss. ... Jan., 53
Garbage Collection, Brookline, Mass. ... Jan., 77
Closed Garbage Truck, Hempstead ... Feb., 17
Double-Duty Side-Car ... Mar., 19
Motor-Mounted Police, Mexico City ... Apr., 42
State Registration Fee ... June, 76
Motorcycles in Law Enforcing ... Nov., 60
See also News and Illustrations, Parks, Snow Removal, Street Cleaning, Streets, Waste Collection

Municipal Accounting and Finance—See Finance

Municipal Bond Market, The
Jan., 86; Feb., 72; Mar., 71; Apr., 65; May, 66; June, 73; July, 67; Aug., 67; Sept., 79; Oct., 66; Nov., 69; Dec., 73

Municipal Offices, Officials, and Employees
Temporary Absence of Councilman ... Jan., 84
Mayor Cannot Hear Charges Against Borough Solicitor ... Feb., 79
Councilman Vacated Office by Removing from Ward ... Feb., 79
Majority Vote—Council ... Feb., 79
Dual Office-Holding ... Feb., 79
Provision for Gasoline Inspection ... Apr., 75
Ordinance Regulating Solicitation of Funds for Charities ... Apr., 75
Removing Officials ... June, 76
Mayor Breaking Council's Tie-Vote ... July, 61
Appointments, Outgoing Commissioners ... July, 61
Council's Refusal to Appoint Successor ... July, 61
Statute for Park Board Upheld ... July, 61
Alien Employees of Water Plant ... Aug., 69
Mayor Breaks Tie-Vote ... Aug., 69
Employment of Special Attorney ... Aug., 69
Neglect in Ministerial Duties ... Sept., 81
Removal of Alderman Unauthorized ... Sept., 81
Pay of Illegally Dismissed Officer ... Sept., 81
Council's Approval of Dismissal ... Oct., 71
Illegality of Bonds ... Nov., 73
Commissioner Interested in Contract ... Nov., 73
Council Candidate's Ineligibility ... Nov., 73
Employing City Attorney ... Dec., 75
One May Be Both Mayor and Justice ... Dec., 75
Hearing Charges Against Fellow Commissioner ... Dec., 75
See also Fire Prevention, Government, Police, Salaries

Municipal Ownership—See Outdoor Lighting, Power Plants, Public Utilities, Water Supply

News and Illustrations
Jan., 90; Feb., 83; Mar., 79; Apr. 83; May, 79; June, 83; July, 73; Aug., 75; Sept., 89; Oct., 79; Nov., 79; Dec., 81

Newspapers
Cooperation for Constructive Economy ... Mar., 58
Municipal Bulletin Not "Newspaper" ... Oct., 71

Noise, Unnecessary
Blowing Locomotive Whistles ... Jan., 84
Amplifying Radio Sounds into Streets ... July, 61
Reducing City Noises, Boston ... Aug., 64

Nuisances
Dog Races ... Nov., 73

Ordinances
Jewelry Store Auctions ... Feb., 79
Inflammable Oil Magazines ... Feb., 79
Prescribing Fixed Penalty ... Mar., 72
Sufficiently Published, 50 Book Copies ... Aug., 69
Violator Not Entitled to Injunction ... Aug., 69
Exclusive Right to Remove Rubbish ... Sept., 81
Business Solicitation in Front of Stores ... Nov., 73
Ordinance Prescribing No Penalty ... Dec., 75

Outdoor Lighting
The City's Great Protector ... Jan., 100
The George Westinghouse Bridge ... Jan., 102
Color Floodlighting, St. Paul ... Jan., 102
Newark-Jersey City Viaduct ... Feb., 92
"Economizing" in Detroit ... Feb., 93
City's Liability for Neglecting Street Lighting ... Mar., 72
Auto Accident on Unlighted Street ... Mar., 72
New System, Evanston, Ill. ... Mar., 88
Floodlighting New York's Municipal Subway Yard ... Mar., 89
Daytime Lighting of Underpasses ... Mar., 90

Issue and Page

Fire Drills by Floodlight — Apr., 19
Street Lighting to Be Developed — Apr., 89
Notable Improvement in Easton, Pa. — Apr., 90
Illuminated Cascades in Oakland — Apr., 91
More Evidence from Detroit — Apr., 91
Distinctive Lighting for Grand Central Parkway — Apr., 92
Drinking Fountains Combined with Lighting Standards, Buffalo Parks — Apr., 92
Street-Lighting Economics Discussed — Apr., 92
Chicago Exposition Marks Lighting Progress — May, 88
Per Capita Use of Electricity for Street Lighting Shows Wide Range — May, 89
Spectacular Illuminated Fountains — May, 89
Making Highways Safer at Night — May, 90
Railroad Station Plaza — May, 90
Modern Lighting Units in Small City — May, 90
Concrete Lighting Standards — June, 93
High-Level Bridge, Hamilton, Ont. — June, 95
Gaseous Discharge Lamps, Highways — June, 95
Sodium Vapor Lamps for Highways — July, 81
Night-Time Lighting of Parks — Aug., cover
Local Materials in Light Plant — Aug., 69
Landscape Lighting in Parks — Aug., 83
Mechanical Base Street Series Lamps — Aug., 85
Special Assessment for White Way — Sept., 81
Illumination of Interurban Arteries — Sept., 95
Increased Street Illumination, St. Paul — Sept., 97
Object of Acquiring Light Plant — Oct., 71
Bridge, Viaduct, Westfield, Mass. — Oct., 87
Illumination of Golf Courses — Oct., 89
Street-Lighting Economics as Affected by the Ability to See — Nov., 89
A Weatherproof Outlet — Nov., 89
Street-Lighting Improvements — Nov., 91
Installation of Highway Lighting — Nov., 91
In Port Jervis, N. Y. — Dec., cover
On a Better-Seeing Basis — Dec., 87
New Street-Lighting Equipment — Dec., 88

Parking
City's Liability for Depreciating Rental Value by "No Parking" Signs — Mar., 72
See also Traffic

Parks and Parkways
232 Acres of Parks, Red Wing, Minn. — Jan., 80
Construction of Road Through Park — Feb., 79
Purchase of Animals for Zoo — Mar., 72
Model Park and Recreation Area — Apr., 45
Illuminated Cascades in Oakland — Apr., 91
Lighting Grand Central Parkway — Apr., 92
Drinking Fountains Combined with Lighting Standards, Buffalo Parks — Apr., 92
Unplanned Use of Labor in Parks — May, 5
Changing Slums into Parks — May, 69
Creating Football Field in Park — May, 71
A Dump That Pays a Dividend — June, 70
Removal of Part of Parkway — June, 76
Neglected Tract Made Beautiful — July, 44
Park Planned from Dump, Dixon — July, 60
Statute for Park Boards Upheld — July, 61
Night-Time Lighting of Parks — Aug., cover
Park Policing — Aug., 15
Landscape Lighting in Parks — Aug., 83
Park and Playground Development — Sept., 58
Planting Boulevards, Sheboygan — Sept., 63
Park Improvement, Perth Amboy — Sept., 64
Diverting Use of Parkway — Oct., 71
George Washington Memorial Parkway — Nov., 77
Beauty of Park Preserved — Dec., 66
See also Recreation

Pavements—See Streets

Pensions
Policeman's Removal for Misconduct — July, 61

Permits
Permit to Sell Cigarettes — Jan., 84
Erection of Dental Sign — July, 61
To Sell Cigarettes — Oct., 71

Playgrounds—See Recreation

Police, Courts and Crime
Police Radio System — Jan., 19
Cooperation with Public — Jan., 75
Reducing Crime in St. Louis — Feb., 19
Discouraging the Criminal — Feb., 71
Compelling Payment of Patrolmen's Salaries — Feb., 79
Abolition of Police Force Position — Feb., 79
Double-Duty Police Side-Car — Mar., 19
Advances in Police Work — Mar., 19
Crime Rate Drops, Then Rises — Mar., 19
Police Stations Replaced, Boston — Mar., 65
Police Alarm, Newton City Hall — Mar., 67
Treatment of Adolescent Delinquents — Mar., 70
Policeman's Removal for Misconduct — Mar., 72
Reward for Capture of Felon — Mar., 72
Adequate Foot Patrol and Intelligent Penal Treatment — Apr., 19
Motor-Mounted Police, Mexico City — Apr., 42
Radio System, Baltimore — May, 64
What to Do With the Present Jail — July, 15
Mobile Public Address System — July, 59
Removal Without Notice or Hearing — July, 61
Pension Right Forfeited — July, 61
Park Policing — Aug., 15
Traffic Police Training School — Sept., 17
International World Police — Sept., 17
Source of New Crime Problem — Sept., 62
Macon's Motorcycle Police — Sept., 65
Suit for Unlawful Arrest — Sept., 81
Policemen Not "Employees" — Sept., 81
Partisan Interference with Police — Oct., 17
New Radio Distribution, Sing Sing — Oct., 17
Fighting Crime with Radio — Nov., 17
Motorcycles in Law Enforcement — Nov., 60
See also Traffic

Issue and Page

Power Plants, Municipal, and Their Equipment
Surface Water Supply, Alaska, Also Furnishes Power — Jan., 9
High-Speed Diesel Engines for Water-Works Pumping Stations — Apr., 46
Electricity Supplied at Good Profit — Sept., 56
Rates, Tennessee Valley Authority — Oct., 66
Rates for TVA Power — Dec., 56
Additional Data on Plants — Dec., 71

Publications
Book and Pamphlet Notices Jan., 87; Feb., 80; Mar., 73; Apr., 77; May, 73; June, 43, 77; July, 69; Aug., 71; Sept., 83; Oct., 75; Nov., 75; Dec., 77

Public Improvements — See Public Works

Public Utilities
Selling Surplus Energy Outside — Jan., 84
City Cannot Contribute Funds for Experts to Appear at Gas Rate Hearing — Mar., 72
Housing a Public Utility, New Jersey — Apr., 5
Proceeds of Municipal Utility Sold — Apr., 75
Ordinance Fixing Minimum Electric Rates Binds Company — Apr., 75
Necessity for Company's Obtaining Municipal Franchise — Apr., 75
Lease of City Light Plant with Option City to Renew, and to Sell to Lessee — May, 71
Discontinuing Service to Delinquent Consumers: Lien for Charges — May, 71
Damages for One Reserving Exclusive Public Utility Rights in Streets — May, 71
Lower Rates Approved — June, 45
Use of Streets for Telephone System — June, 76
Compulsory Relocation of Conduits — June, 76
Both Private and Municipal Plants — Aug., 69
Contract to Buy Equipment — Aug., 69
Charge for Private Fire Service — Aug., 69
Utilities and the Blue Eagle — Sept., 5
Rate Making for Water Service — Sept., 47
Bond Issue for Lighting Equipment — Sept., 81
Interurban Railroad Franchise — Sept., 81
Tax on Purchase of Electricity, etc. — Oct., 71
Object of Acquiring Light Plant — Oct., 71
Revision of Rates in Franchise — Oct., 71
Injunction Against Invalid Steps for Competing City Plant — Oct., 71
Paying for Equipment from Revenues — Nov., 73
Gas Company's Adequate Return — Nov., 73
Paving for Equipment from Revenues — Nov., 73
Public Utilities in Recent Elections — Dec., 17
Profitable Utilities; No Bonded Indebtedness — Dec., 65
Telephone Rates Prescribed by City — Dec., 75
See also Outdoor Lighting, Power Plants, Sewers, Transportation, Water Supply

Public Works
Jersey City-Newark Viaduct — Jan., cover
R.F.C. Reduces Interest Rates — Jan., 5
Accelerating Self-Liquidating Works — Jan., 5
Self-Liquidating Loans Granted Jan., 5; Feb., 5; Mar., 5 — Apr., 5
Fair Play in Paving for Improvements — Jan., 71
Self-Liquidating Projects Sluggish — Feb., 5
$5,000,000,000 for Public Works and Housing? — Feb., 43
$20,000,000 Investment in Emergency Work Jobs — Feb., 72
Minimum Wage Schedules on Public Works — Feb., 79
Employment of Aliens on Public Works — Feb., 79
Three Major Tasks — Mar., cover
Necessary Permanent Public Works — Mar., 5
Executing Great Projects — Mar., 5
Authority and Responsibility of Public Works Engineers — Mar., 11
Clear Thinking on Public Spending — Mar., 39
Ultimate Economy of Public Works Program — Mar., 40
Vigorous Offensive for Prosperity — Mar., cover
Why Not Give Money a Job? — Apr., 5
Spend Till It Helps — Apr., 39
Extending Planning to a Wider Field — May, cover
Will Local Plans Be Ready? — May, 35
"The Future Is to the Planners" — May, 42
Social Workers Discuss Public Works — May, 42
$3,300,000,000 of Public Works — June, cover
Federal Aid for Public Works — June, 5
Underground Installations, Germany — June, 11
R. F. C. Fades Out of Picture — July, 5
Averting Future Depressions — July, 5
Federal Loans and Grants — July, 35
Applying for Approval of Projects — July, 36
Statement by Administrator Ickes — Aug., 5
Personnel, State Advisory Boards — Aug., 5
Ten Regional Advisors — Aug., 67
Personnel of Planning Board — Aug., 67
Local Materials, City Light Plant — Aug., 69
Officials of PWA — Sept., 5
State Engineers for PWA — Sept., 5
One-Third of Fund Allotted — Sept., 5
Municipal Utilities, Blue Eagle — Sept., 5
International Association of Public Works Officials — Sept., 7
Kalamazoo's Model of NIRA — Sept., 50
Answer of Water-Works Industry — Sept., 68
New Appointments, Advisory Boards — Sept., 75
Tennessee Valley Authority Project — Sept., 77
Regional Inspectors Appointed — Sept., 79
To Speed Up Local Public Works — Oct., cover
A Challenge to American Mayors — Oct., 5
Funds for Streets Within Cities — Oct., 11
PWA Technical Board of Review — Oct., 45

Issue and Page

The Fund in Relation to Pavements — Oct., 46
Chamber of Commerce Viewpoint — Oct., 48
30 Per Cent Grants to Cities — Oct., 58
Have Your City and County Applied? — Nov., cover
Projects Approved by PWA — Nov., 5
Field Men for Emergency Problems — Nov., 45
Using Funds Within City Limits — Nov., 49, 64
Legislation Making Funds Available — Nov., 68
PWA and Roadside Improvement — Nov., 68
PWA Speeding Action on Allotments — Nov., 69
PWA and Emergency Relief — Nov., 69
PWA Favors Municipal Utilities — Nov., 69
Three More State Engineers — Nov., 69
Maximum Prompt Employment — Nov., 69
Off the Relief Roll — Dec., 5
In Oak Park, Ill. — Dec., 11
New TVA Town, Norris, Tenn. — Dec., 67
Detroit Public Housing — Dec., 68
Non-Federal Applications Pending — Dec., 72
Winter Work to Be Pushed — Dec., 72
PWA Inspection Division and Board of Labor Review — Dec., 72
Civil Works Employees Covered by Federal Compensation — Dec., 73
Eligible Civil Works Projects — Dec., 73
Federal Funds for Local Planning — Dec., 73
See also Bridges, Contracts, Finance, Outdoor Lighting, Parks, Power Plants, Sewers, Streets, Water Supply

Purchasing
Purchasing Animals for Zoo — Mar., 72
Buying Equipment on Conditional Sales Contract — Aug., 69
Purchasing in "Open Market" — Aug., 69
Withholding Payment for Equipment — Sept., 81
Conditional Sales Contract — Nov., 73

Race Discrimination
Swimming Lessons, Colored Pupils — Oct., 71

Radio
"You and Your Government" Series — Jan., 53
Talks on Government, Oklahoma — Jan., 86
Civic Radio Education in Virginia — Mar., 44
Broadcasts in New York State — Apr., 68
"Learn About Your Government" — July, 67
City Reports by Radio — Aug., 64
New Distribution for Sing Sing — Oct., 17; Nov., 48
Broadcasts on Municipal Finance — Oct., 41
Using Radio to Fight Crime — Nov., 17
See also Police

Real Estate—See City Planning

Recreation
Varied Program, Berkeley, Calif. — Feb., 67
Replacing Baltimore's "Lung Block" — Feb., 68
Ashes and Cinders for Building Golf Course in Winter — Feb., 68
Longmont Turns County Fair Grounds into Recreational Center — Mar., 52
Don't Skimp on Play! — Mar., 54
Beach Playground, Los Angeles — Mar., 64
Recreation for Unemployed, Boston — Apr., 64
Children "Play Safe" at Playgrounds — Apr., 65
Good Use of Leisure Time, Janesville — May, 61
Money Judgment Not Enforceable Against City Golf Course — May, 71
Titusville High School Grandstand — May, 63
He Had No Other Playground — June, 17
Financing Beach Protection — June, 71
Club Operating Bowling Alleys — July, 61
Misuse of Merry-go-round in Park — Aug., 69
Under Present Conditions — Aug., 41
Injuries Caused by Toboggan Slide — Sept., 81
Free-Time Activities Councils — Oct., 53
Illumination of Golf Courses — Oct., 89
Equipping the Park for Recreation — Dec., 65
Leisure-Time Problem, New Jersey — Nov., 67
Death of Bather in Municipal Pond — Nov., 73
See also Parks, Swimming Pools

Refuse Collection and Disposal—See Waste

Referendum
Land Purchase for Market Not Subject to Referendum — Mar., 72
Contract for Legal Advertising in Newspapers Not Subject to Referendum — May, 71
Repeal of Authority for Gas Plant — Aug., 69

Regional Planning—See City Planning

Reports, Municipal—See Publications

Roadside Improvement
Aid from NIRA — Oct., 65
Movement Launched by PWA — Nov., 68

Road Signs—See Billboards

Roads—See Streets

Safety—See Accident Prevention

Salaries
Compelling Payment of Patrolmen — Feb., 79
Minimum Schedules on Public Works — Feb., 79
Liability; Salary Paid to Usurper — Sept., 81
Illegally Dismissed Officer's Pay — Sept., 81
Minimum Pay, Probation Officers — Oct., 71
Prevailing Rate of Wage Statute — Nov., 73
Reduction of Village Marshal's Salary — Dec., 75

Schools
Cutting Costs; Maintaining Standards — Feb., 78
New School, Lower Taxes, No Pay Cuts — Mar., 81
Teaching Community Planning — May, 62
Federal Relief Funds — Sept., 85
Good Schools in Bad Times — Oct., 66

Sewers and Sewerage Disposal
Tacoma's Unemployment Relief — Jan., 13
Explosion Hazards in Manholes — Jan., 13
Visitors, and Publicity for Plants — Jan., 13

Issue and Page

Charges for Sewerage Service ... Jan., 65
Self-Sustaining Sewerage Systems ... Feb., 13
Operating Trickling Filters ... Feb., 13
Self-Liquidating Works, Indiana ... Feb., 13
Brick Storm Sewer, Denver ... Feb., 13
An Unusual Sewage Treatment Plant ... Feb., 54
Damages for Sewage Discharge from Permanent Outlet ... Feb., **79**
Discharging Untreated Sewage into Hampton Roads ... Feb., 79
Constructing a Sewer Outlet ... Mar., 13
Standardization of Cast Iron Soil Pipe ... Mar., 13
Baltimore Sewage Treatment Plant ... Mar., 55
Quantities of Sewage Produced ... Apr., 13
Cleaning Large Sewers ... Apr., 13
Sewage Screenings Disposal ... Apr., 13
Novel Sewer Financing ... Apr., 60
Contract under Local Hand Labor ... Apr., 75
Failure to Sign Sewer Contract; Collapse of Sewer ... Apr., 75
Ohio Court Rules That City Must Build Sewage Treatment Plant ... May, 13
Disposal Plant, Colby, Kans. ... May, 13
Cleaning Catch-Basins ... May, 13
Treatment Plant, Huron, S. Dak. ... May, 39
Sewer Assessment Against Property on Opposite Side of Highway ... May, 71
Fighting the Psychoda ... June, 13
Sewer Siphons Without Cofferdams ... June, 13
Building Sewer Works ... June, 13
Charges for Sewerage Service ... June, 68
Outstanding Sewer Warrants ... June, 76
Insufficient Drain ... June, 76
Insufficient Sewer-Drainage System ... June, 76
Sewer Included in Paving ... June, 76
Financing a Sewer District ... July, 13
A 43-Year-Old Brick Sewer ... July, 13
Cleaning Sewage Pump Suction Wells ... July, 13
Charges for Treating Trade Wastes ... July 45; Aug., 44
Renovating a Sewage Disposal Plant ... July, 47
Sewage Disposal System Compulsory ... July, 61
Sewer Service to Milk Plant ... July, 61
Catch-Basin Cleaning ... Aug., 13
Disposal at Holland, Mich. ... Aug., 13
Sewer Maintenance ... Aug., 13
Effect of Civilization ... Aug., 13
Financing Sewerage Works ... Aug., 40
Depreciation of Land Values ... Aug., 69
Sewage Disposal Nuisance ... Aug., 69
Catch-Basin Cleaning ... Sept., 13
Treatment with Coagulant ... Sept., 13
From Disposal by Dilution to Separate Sludge Digestion ... Sept., 45
Revenue Bonds for Sewerage ... Sept., 61
Nuisance, Defective Sewer ... Sept., 81
Inadequate Sewer ... Sept., 81
Sewage Discharge into Creek ... Sept., 81
Checking Infiltration into System ... Oct., 13
Control of Odors ... Oct., 13
Plant Among Attractive Surroundings ... Oct., 43
Storm-Sewer Assessments ... Oct., **56**
Liability, with Canning Company ... Oct., 71
Sewage Discharge in Creek ... Oct., 71
Sewage Pollution of Fish Hatchery ... Oct., 71
Assessment for Sewer ... Oct., 71
Front Footage and Area Assessment ... Oct., 71
Clanking Manhole Covers ... Nov., 11
Sewer Rental Laws ... Nov., 13
Removing Tree Roots from Sewers ... Nov., 13
Treatment Plant, Erie, Pa. ... Nov., 13
Water Metering and Sewage Disposal ... Nov., 13
Hagerstown Modernizes Its Plant ... Nov., 57
Gas Hazards in Sewage Plants ... Dec., 13
Reconditioning Sewage ... Dec., 13
Incinerating Sewage Sludge ... Dec., 39
Piping a Creek ... Dec., 55
When Sewer Connections Are Possible ... Dec., 75
Lack of Immediate Benefit ... Dec., 75
Forming Sewer Districts ... Dec., 75

Sidewalks

Defects in Construction Held Not to Avoid Special Assessment ... May, 71
Defective Construction by Contract ... July, 61
Private Driveways Across Sidewalks ... Oct., 71
Repair, Sidewalk Across Parkway ... Nov., 73
Tripping on Ledge in Sidewalk ... Nov., 73
Slimy Condition of Sidewalk ... Nov., 73
Market Stands on Sidewalk ... Dec., 75
Sidewalk Below Street Grade ... Dec., 75

Smoke Abatement

Smoke Need Not Be Tolerated ... Aug., 61

Snow Removal

Preventing Plows from Being Stuck in Drifts ... Mar., 11
In Elkhart County, Ind. ... Aug., 49
Winter of 1933-34 ... Sept., 53
Experience, American Municipalities ... Oct., 59
Snow Removal in the United States ... Nov., 52
Fighting the Ice Hazard ... Dec., 46
Snow Must Go ... Dec., 57
In Kennett Square, Pa. ... Dec., 60

Social Progress

Wellesley Summer Institute ... May, 57

Street Cleaning

Flushers Keep Jackson Streets Clean ... Jan., 53
The Efficiency of Street Cleaning ... Feb., 64
Pick-up Sweepers and White Wings ... Mar., 63
Cost Accounting for Street Cleaning ... Apr., 61
Motor Pick-up Sweeper, Winter Haven ... May, 11
In Berlin ... July, 11
Cleaning and Flushing Paved Streets ... Aug., 11
By Flushing ... Dec., 11
In Three German Cities ... Dec., 62
See also Snow Removal

Street Lighting—See Outdoor Lighting

Issue and Page

Streets (Boulevards, Highways, Pavements, Roads, Sidewalks)

Need of Continued Federal Aid ... Jan., 5
Alley Pavement in Minneapolis ... Jan., 11
Flexible Base Construction Using Emulsified Asphalt ... Jan., 11
Maintenance Costs Cut One-Half ... Jan., 47
Recent Developments in Brick Paving ... Jan., 55
Bituminous Paving, Austin, Texas ... Jan., 67
Explosion Tank, Street Grader ... Jan., 84
Vitrified Brick, Experimental Highway ... Feb., 11
Vitrified Paving Brick, Simplified Practice ... Feb., 11
Beach Sand for Bituminous Road ... Feb., 47
Rigid Frame Bridge ... Feb., 57
Pathmasters Are Past ... Feb., 62
Use Gas Tax for Roads Only ... Feb., 66
Defective Drain Cover ... Feb., 79
Sloping Sidewalk Worn Smooth ... Feb., 79
Stakes Left Near Sidewalk ... Feb., 79
Thickness of Concrete Paving Not According to Contract ... Feb., 79
Right to Attack Assessment Lien ... Feb., 79
Hot-Mix Asphalt Plant, Sydney ... Mar., 11
Unemployment Relief, East Peoria ... Mar., 13
Construction with Asphalt Emulsion ... Mar., 43
Resurfacing Brick with Brick ... Mar., 47
Taxes Paid by Motorists ... Mar., 48
Reflectorized Roadside Maps ... Mar., 66
Origin and Destination Survey, Monroe County, N. Y. ... Mar., 68
Defective Water-Meter Lid ... Mar., 72
Railroad Crossing Signal in Street ... Mar., 72
Narrowing Sidewalks to Widen Road ... Mar., 72
Removal of Private Switch Track ... Mar., 72
Inspection, Care, of Sidewalks ... Apr., 11
Oil Blotter Method, Dirt Streets ... Apr., 11
Canada Spends Millions on Roads ... Apr., 11
Maintenance Practice in Europe ... Apr., 41
Low-Cost Permanent Type Pavement ... Apr., 49
Resurfacing Thin Pavements with Thin Layers of Bituminous Mixtures ... Apr., 54
Street-Widening Award to Abutter ... Apr., 75
Investigation of Mud-Jack Soils ... May, 11
Cotton Fabrics in Bituminous Roads ... May, 11
Calcium Chloride as Dust Layer ... May, 11
A Stabilized Gravel Street ... May, 46
Low-Cost Roads in Pennsylvania ... May, 53
Contract Awarded Without Bidding ... May, 71
Street-Filling Contract: No Warrant Against Subsidence of Surface ... May, 71
Judgment Reducing Improvement Assessment ... May, 71
Assessing Property Separated from Street by Excess Strip ... May, 71
Spreading Assessments Between Lots ... May, 71
Removal of Filling-Station Adjuncts ... May, 71
Erection of Gasoline Pumps in Street ... May, 71
Emergency Construction, Highways ... June, 5
Typical Hot-Mix Resurfacing Job ... June, 44
Highway Planning for Counties ... June, 50
Bituminous Surface Treatments ... June, 59
Roadways in New Orleans Park ... June, 70
Repair of Sidewalks ... June, 76
Sewer Included in Paving ... June, 76
Delinquent Payment of Assessment ... June, 76
Inadequate Provision for Damages ... June, 76
City Dock Ramp an Encroachment ... June, 76
Major Highways, New York Region ... July, cover
Paying Taxes by County Road Work ... July, 11
Cement-bound Macadam ... July, 11
Experimental Section, Farm Road ... July, 11
Replaceable Paving, Tunnels ... July, 37
Maintenance, County Equipment ... July, 51
Surface Treatment, Topsoil Roads ... July, 56
Slipping on Traffic Mark ... July, 61
No Damages for Non-Abutter ... July, 61
Land Dedicated as Street ... July, 61
Abutter's Title to Vacated Street ... July, 61
Vacation of Street for Station ... July, 61
Replacing Utility Cuts ... Aug., 11
One Paving Job Aids 29 Counties ... Aug., 11
High Type Surface; Low Type Cost ... Aug., 38
Road-Mix in Indiana ... Aug., 50
Reopening Vacated Street ... Aug., 69
Using Care to Make Street Safe ... Aug., 69
License Fees for Roads, Montana ... Sept., 11
The Dole or Highway Work ... Sept., 11
Port Jervis Through Highway ... Sept., 11
Street Oiling, N. Y. State, 1932 ... Sept., 11
Calcium Chloride as Binder ... Sept., 41
Sand-Clay Base, Brick Pavement ... Sept., 55
Assessing State Lands ... Sept., 81
Federal Funds, Streets in Cities ... Oct., 11
Public Works Funds, and Pavements ... Oct., 46
Welfare Labor, Onondaga County ... Oct., 61
Improving Macadam Pavements ... Oct., 64
Paying Assessment in Paving Bonds ... Oct., 71
Damages, Deprivation of Access ... Oct., 71
Enjoining Vacation of Street ... Oct., 71
Closing Half of Street ... Oct., 71
Wayne County Aided Employment ... Nov., 11
Spending the 1933 Highway Dollar ... Nov., 11
Bituminous Macadam Surfacing ... Nov., 42
Federal Funds Within City Limits ... Nov., 49
Cement-Bound Macadam, Mason City ... Nov., 51
A Sympathetic Street Department ... Nov., 61
Federal Funds Within City Limits ... Nov., 64
Maintaining Safe Conditions ... Nov., 75
Street Tax on Motor Carriers ... Nov., 73
Port Jervis, N. Y. ... Dec., cover 45
Contract Work, Wayne County, N. Y. ... Dec., 11
Bituminous Macadam, N. Y. State ... Dec., 11
Contract Work ... Dec., 11
American Road Builders' Convention ... Dec., 11
Brick Pavements ... Dec., 50

Issue and Page

Failure to Construct Retaining Wall ... Dec., 75
Failure of Old Base ... Dec., 75
Non-Benefiting Street Improvement ... Dec., 75
Moving Buildings Along Streets ... Dec., 75
Public Market on Street ... Dec., 75

Sunday Restrictions

Ordinance Forbidding Sunday Movies ... Mar., 72
Sunday Labor, Motion Pictures ... June, 76
Butcher Shops Closed ... Nov., 73

Swimming Pools

Doing as the Romans Did ... Mar., 46
Drowning Due to Attendants' Neglect ... Mar., 72
Developing "Natural" Pools ... Apr., 71

Taxation—See Finance

Theaters

A Modern Form of Greek Theater ... Apr., 65
See also Motion Pictures

Traffic Control and Facilitation

New Traffic Safety Contests ... Jan. 19
Traffic-Law Violations, Washington ... Jan., 82
Downtown Pedestrians, Los Angeles ... Jan., 82
Light Placement, Control Cost, Pittsburgh ... Jan., 82
New Members of the Institute ... Jan., 83
British Motor Traffic Expands ... Jan., 83
Signals ... Jan., 83
Limiting Vehicle Lengths and Loads ... Jan., 84
Fewer Traffic Deaths in 1932 ... Feb., 19
Speed as a Cause of Accidents ... Feb., 73
New Type of Protected Trafficway, Westchester County, N. Y. ... Mar., 59
Reflectorized Road Maps ... Mar., 66
Origin and Destination Survey, Monroe County, N. Y. ... Mar., 68
Equipment versus Accident Costs ... Mar., 68
Coordination of Street and Rail Traffic at Intersection ... Mar., 69
Collision with Traffic Post in Street Intersection ... Mar., 72
Pedestrian Ignoring Safer Course ... Mar., 72
Traffic Accidents ... Apr., 19
Children "Play Safe" at Playgrounds ... Apr., 65
Choosing America's Safest Cities ... Apr., 66
Fewer Street Accidents to Children ... May, 19
A Hazardous Scheme for Safety ... May, 19
Treatment of Arterial Parkways ... May, 36
Timing of Signals, Washington, D. C. ... May, 67
Traffic Congestion in Denver ... May, 67
"Il Traffic Urbano" ... May, 67
Checking Traffic Predictions in Connecticut ... May, 68
Illuminated Pedestrian Crossing, Paris, France ... May, 68
Install Traffic Equipment Now ... May, 68
Traffic Engineering, Town Planning ... May, 68
Driving While Intoxicated ... May, 71
Power to Designate Through Streets ... May, 71
Emergency Work for Facilitation ... June, 5
Traffic Signals on Ohio Roads ... June, 17
He Played in the Street ... June, 17
Parking Charge for Beach ... June, 71
Massachusetts Studies Two Cities ... June, 74
Pedestrians Must Use Crosswalks ... June, 76
Parking Ordinance Upheld ... June, 76
Regulating Intercity Busses ... June, 76
Express Highways, New York Region ... July, 40
Mobile Public Address System ... July, 59
Regulating Vehicles and Loads ... July, 61
National Safety Traffic Contest ... July, 62
Los Angeles Traffic School ... July, 63
Rochester Engineering Soc. Survey ... July, 63
News of Traffic Engineering ... July, 63
Traffic-Actuated Control, Montreal ... Aug., 65
A Highway Safety Campaign ... Sept., 17
Safety of Divided Roadways ... Sept., 69
Institute of Traffic Engineers ... Sept., 70
The Yonkers Traffic Survey ... Sept., 70
Setting Progressive Signals ... Sept., 70
Collision, Unlighted Signal ... Sept., 81
Luminous and Non-Luminous Signs ... Oct., 69
"Reasonable Speed" Signs ... Oct., 69
Installing Directional Signs ... Oct., 69
Justice to Traffic Violators ... Oct., 70
President Approves School Patrols ... Oct., 70
Ordinance Forbidding Turning ... Oct., 71
Speed Control on Arterial Highway ... Oct., 71
Left-Half Turns Forbidden ... Oct., 71
Effect of Signalization, Accidents ... Nov., 63
National Traffic Safety Contest ... Nov., 64
Minimum Age of Drivers ... Nov., 73
Pedestrians Must Use Crosswalks ... Nov., 73
Traffic Safety Contest, 1934 ... Dec., 17
Treatment of Complaints, Requests ... Dec., 69
Yale's Traffic Bureau ... Dec., 69
The Pedestrian and Our Highways ... Dec., 70
Facilitating Traffic, 2-Lane Highway ... Dec., 70
See also Accident Prevention, Transportation

Traffic Control and Facilitation (Department)

Jan., 82; Feb., 73; Mar. 68; Apr., 66; May, 67; June, 74; July, 62; Aug., 65; Sept., 69; Oct., 69; Nov., 63; Dec., 69

Transportation

Village Operating Bus System Serving Non-Inhabitants ... Mar., 72
Ordinance Fixing Taxicab Rates ... Apr., 75
Bus License Fee Provided for But Not Imposed ... May, 71
Modifying Street-Railroad Franchise ... May, 71
Regulation, Interurban Busses ... June, 76
Local Transportation, Chicago ... June, 76
Regulation, Intercity Busses ... June, 76
Interurban Sightseeing Busses ... July, 61

	Issue and Page
Operation of Taxicabs	July, 61
Taxicab License Revocable; Fraud	July, 61
Minimum Taxicab Fares	July, 61
Street Railroad's Duty to Repave	Sept., 81
Annapolis Interurban Railroad	Sept., 81
Taxicab Regulation, Pennsylvania	Sept., 81
Vehicles Carrying Passengers	Sept., 81
Tree Planting and Protection—See Forestry	
Unemployment Problem and Relief	
Jersey City—Newark Viaduct	Jan., cover
Balancing the Depression	Jan., 5
Need of Continued Federal Aid	Jan., 5
Tacoma Employs 1,500 on Streets	Jan., 13
A View of Governmental Spending	Jan., 49
Federal Aid to States and Cities	Jan., 54
Park Improvement, Red Wing, Minn.	Jan., 80
County's Work-Relief Plan	Jan., 81
Flow of Self-Liquidating Projects	Feb., 5
$20,000,000 in Emergency Work Jobs	Feb., 72
Service Pipe Campaign	Mar., 7
Canada Building Flying Fields	Mar., 11
218 Unemployed Men Busy, E. Peoria	Mar., 13
Clear Thinking on Public Spending	Mar., 39
"Modernize Your Home" Plan	Mar., 65
Why Not Give Money a Job?	Apr., 5
Spend Till It Helps	Apr., 39
Model Park and Recreation Area	Apr., 45
Shall We Balance Budgets or Minds?	Apr., 50
Recreation and Education	Apr., 64
Unplanned Use of Labor in Parks	May, 5
Social Workers Discuss Recovery	May, 42
Building High School Grandstand	May, 63
Labor on Water Supply, Bristol	June, 46
New Orleans Park Extension	June, 70
A Dump That Pays a Dividend	June, 70
Iowa Conservation Plan	June, 73
Averting Future Depressions	July, 5
Neglected Park Beautified, Johnstown	July, 44
The Dole or Highway Work	Sept., 11
Kalamazoo's Model of NIRA	Sept., 50
Snow Removal, 1933-34	Sept., 53
Police, Firemen Dropped, Detroit	Sept., 81
The Alternative to the Dole	Oct., 55
NRA Codes and City Tax Rates	Oct., 60
Highway Labor, Onondaga County	Oct., 61
NIRA Aids Roadside Improvement	Oct., 65
Emergency Work Bureau, Mineola	Oct., 69
Poor Relief a "Public Purpose"	Oct., 71
Non-Exemption from Poll Tax	Oct., 71
Character of Work Performed	Nov., cover
Trench Work for 119 Men	Nov., 7
Wayne County Aided Employment	Nov., 11
Road Work, Mason City; Scrip	Nov., 54
Chamber of Commerce, Scouts, NRA	Nov., 62
Maximum Prompt Employment	Nov., 69
Onto the Pay Roll	Dec., 5
In Port Jervis, N. Y.	Dec., 45
See also Housing and Public Works	
Utilities—See Public Utilities	
Wages, Hours of Labor	
Public Employees Not Affected by Codes	Aug., 5
Common Street Laborers	Aug., 86
Waste Collection and Disposal	
Garbage Disposal in Various Places Jan., 17; Feb., 17; Mar., 17; Apr., 17; May, 17; June, 15; Sept., 15	
Under Town Government, Brookline	Jan., 76
Reducing Garbage and Refuse Budget	Feb., 17
Closed Garbage Truck, Hempstead	Feb., 17
Well-Balanced Waste Collection and Disposal	Feb., 52
From City Dump to Golf Course	Feb., 68
Long Haul and Short Haul	Mar., 57
Cost Accounting for Waste Collection and Street Cleaning	Apr., 61
Bidding Specifications Refused to Garbage Removal Contractors	Apr., 75
Refuse Disposal in Los Angeles	May, 55
Fire Spreading from Dumping Ground	May, 71
Disposal of Household Wastes June, 51;	July, 53
A Dump That Pays a Dividend	June, 70
New Incinerator, Portland, Ore.	Aug., 55
Dumps, Harbor Rats, Flies	Sept., 15
Dump, Islip, L. I., N. Y.	Sept., 15
In Minneapolis, Minn.	Sept., 57
Exclusive Right to Remove Rubbish	Sept., 81
In Bremerton, Wash.	Oct., 15
Controlled Tipping	Oct., 15
Collection Methods in England	Oct., 15
Garbage Disposal in Milwaukee	Oct., 49
Unusual Management, Refuse Disposal Plant	Nov., 15
Tractor Aids Refuse Handling	Nov., 15
Effective Rat Control Problem	Nov., 15
Cleanliness at the Incinerator	Nov., 50
In Oak Park, Ill.	Dec., 15
Increased Collection; Reduced Cost	Dec., 15
In Wilmette, Ill.	Dec., 15
Contract Collection Vetoed	Dec., 15
Garbage from 11,500 Households	Dec., 61
In Three German Cities	Dec., 62
Waterfronts	
Buffalo Develops Its Waterfront	May, 61
Steel Sheet Piling Bulkhead, Asbury Park, N. J.	May, 62
Water Supply and Water Works	
Modernizing Water-Works Administration	Jan., 7
The Origin of Color in Water	Jan., 7
5,000,000-Gallon Standpipe, Lancaster	Jan., 7
Color Removal, Marshfield, Ore.	Jan., 9
Surface Supply Furnishes Power	Jan., 9
New Hollywood Steel Pipe Line	Jan., 9
Water Consumption in Newark, N. J.	Jan., 9
Correcting Trouble with Customers' Services	Jan., 50
Meter Registration; Water Revenue	Jan., 58
Securing Town's Water Supply	Jan., 84
Missouri City Supplies Kansas Consumers	Jan., 84
Authorizing Metropolitan Water District Bonds	Jan., 84
Water Department Keeps Separate Accounts	Feb., 7
Ammonia, Chlorine, Activated Carbon	Feb., 7
Benefits, Elevated Tank and New Well	Feb., 7
Water Meters Aid Revenue Feb.-Dec.,	9
Mountain Water for Industrial City	Feb., 44
Eight Years' Experience with Mains	Feb., 50
Pumped Storage for Water Supply	Feb., 60
School District Liable for Supply	Feb., 79
Selma, Ala., Aerators, Control House Mar.,	cover
Operating Costs Reduced, Litchfield	Mar., 7
St. Paul, Minn., Water Supply	Mar., 7
Service Pipe Campaign	Mar., 7
A Deep-Well Water System	Mar., 41
$4,000 for Leakage Survey Saves $500,000 in Water	Mar., 45
Protecting Water Works from Floods	Mar., 53
An Architectural Water Tank	Mar., 54
Rules for City Selling Water	Mar., 72
Tax Against Property for Water Works	Mar., 72
Automatic Pumping Stations	Apr., 7
The Peru Water Filtration Plant	Apr., 7
A Record in Collecting Water Bills	Apr., 7
"Water Fuse" for Hot-Water System	Apr., 7
Rebuilt Water Works Includes Softening	Apr., 43
High-Speed Diesel Engines for Water-Works Pumping Stations	Apr., 46
The War on Mud Balls	Apr., 57
Dam's Depreciation of Property	Apr., 75
Rule for Extension of Mains	Apr., 75
Liability for City's Unwholesome Water	Apr., 75
Right to Divert Water	Apr., 75
Driving Trespassing Cattle from Unfenced Watershed	Apr., 75
New Los Angeles Reservoir	May, 7
Water-Waste Survey, St. Louis	May, 7
Financial Policy, Pasadena Water Department	May, 7
Three Miles Electric-Welded Main	May, 7
Treatment, Water Supply, Wellsburg	May, 43
Water Supply, Boulder, Nev.	May, 51
Maintenance of Water Meters	May, 54
Ordinance Providing Payment for Water Used by City	May, 71
Water Department Regulations	June, 7
36-Inch Cast Iron Main	June, 7
Lead Services in Milwaukee	June, 7
Developments in a Borough Supply	June, 41
Increasing Supply, Bristol, Conn.	June, 46
Powdered Activated Carbon	June, 49
Pumps and Their Places June, 62;	July, 41
The Supply in Staunton, Va.	June, 65
Metropolitan District Assessment	June, 76
Election on Water System	June, 76
Waste Control Offsets Greater Use	July, 7
Saving 700,000 Gallons Daily	July, 7
Elevated Tank Reduces Power Consumption	July, 7
Thawing of Frozen Services	July, 7
Water-Supply Advertisements July, 9; Aug., 9; Sept., 9;	Oct., 7
Softening Plants for Small Cities	July, 49
In Many States	Aug., 7
Public Water Supplies in Iowa	Aug., 7
Keep Meters Off the Floor	Aug., 7
Creosoted Wood Pipe	Aug., 7
Clothing the Old Water Tower	Aug., 43
American Water Works Association	Aug., 47
Pumping in Normal, Ill.	Aug., 48
Tastes and Odors, Philadelphia	Aug., 53
More Economy in Water Works?	Aug., 57
Charge for Private Fire Service	Aug., 69
Elevated Water-Supply Tank Sept.,	cover
Four-Million-Gallon Storage Tank	Sept., 39
The Problems of Rate Making	Sept., 47
Metering; Consumption; Costs	Sept., 52
Tank Houses Aeration System	Sept., 54
Revenue Bonds for Water Supply	Sept., 61
Answer of Water-Works Industry	Sept., 68
Unusual Elevated Storage Tank	Sept., 79
Chamber Promoted Improvements	Oct., 7
Joint Leaks in Water Mains	Oct., 7
Improving Coagulation	Oct., 7
Lime-Soda Water-Softening Plant	Oct., 7
Reduction of Corrosion in Pipe	Oct., 51
Crossing a Tidal Stream with a Main	Oct., 54
Handling Delinquent Accounts	Nov., 7
Treatment for Taste and Odor	Nov., 7
Trench Work Employed 119 Men	Nov., 7
Metering and Sewerage Disposal	Nov., 13
Maintenance, Reading, Billing for a Metered System	Nov., 37
Criminal in Taste and Odor Field	Nov., 44
Filtration, Pumping Plant, Easton	Nov., 46
Lien for Water Rates	Nov., 73
In Indianapolis	Dec., 7
Breaks in Mains	Dec., 7
Manganese Removal	Dec., 7
Zeolite Plant, Lancaster, Ohio	Dec., 41
Installing 60-Inch Main	Dec., 59
Welfare	
How Shall We Treat Adolescent Delinquents and Wandering Youths?	Mar., 70
Wharves	
Dock Ramp a Street Encroachment	June, 76
Who's Who	
p. 15, Jan., Feb., Mar., Apr., May	
Workmen's Compensation	
Irregular Appointment of Motorcycle Policemen	Mar., 72
Policemen Not Employees	Sept., 81
Municipalities as Employers	Sept., 81
Muicipalities Covered by Statute	Nov., 73
Zoning and Planning Notes	
Jan., 85; Feb., 76; Mar., 71; Apr., 69; May, 65; June, 73; July, 73; Aug., 66; Sept., 85; Oct., 73; Nov., 71; Dec., 74	

Index to Places

	Issue and Page
Akron, Ohio	
Housing	Dec., 49
Alamosa, Colo.	
Water meters	Feb., 9
Albany, N. Y.	
Bridge	Aug., 11
Alexandria, Va.	
Refuse disposal	June, 15
Arizona	
Sales tax	June, 72
Asbury Park, N. J.	
Wesley Lake bulkhead	May, 63
Asheville, N. C.	
Refuse disposal	May, 17
Atlanta, Ga.	
Storage tank	Sept., 79
Atlantic, Iowa	
Water meters	June, 9
Atlantic Beach, N. Y.	
Sewage disposal	July, 13
Auburn, N. Y.	
Refuse disposal	Apr., 17
Augusta, Maine	
Water meters	Sept., 9
Austin, Texas	
Unemployment relief	Jan., 67
Baltimore, Md.	
Slum elimination	Feb., 68
Sewage disposal	Mar., 55
Water supply	Apr., 7
Police radio	May, 64
Refuse disposal	June, 51
Taxation	July, 59
Water meters	Aug., 9
Water pipe	Oct., 51
Water system	Nov., 37
Batavia, Ill.	
Water meters	Apr., 9
Battle Creek, Mich.	
Refuse disposal	Jan., 17
Bay City, Mich.	
Refuse disposal	Jan., 17
Beaumont, Texas	
Safety	Apr., 19
Beaver Falls, Pa.	
Refuse disposal	June, 15
Belmont, Mass.	
Water meters	Nov., 9
Bergenfield, N. J.	
Refuse disposal	Apr., 17
Berkeley, Calif.	
Recreation	Feb., 67
Berkley, Mich.	
Refuse disposal	Mar., 17
Berlin, Germany	
Street cleaning	July, 11
Berwyn, Ill.	
Snow removal	Nov., 52
Big Lagoon, Calif.	
Highway	Feb., 47
Biloxi, Miss.	
Refuse disposal	Mar., 17
Binghamton, N. Y.	
Reports—radio	Aug., 64
Bloomfield, N. J.	
Water supply	July, 7
Blue Earth Co., Minn.	
Paving	Aug., 11
Bluefield, W. Va.	
Refuse disposal	Apr., 17
Blytheville, Ark.	
Water meters	May, 9
Boston, Mass.	
Manhole explosions	Jan., 13
Refuse disposal	Jan., 17
Police headquarters	Mar., 65
Airport	Apr., 51
Unemployment aid	Apr., 64
Noise	Aug., 64
Housing	Sept., 73
Snow removal	Dec., 57
Boulder City, Nev.	
Water supply	May, 51
Brainerd, Minn.	
Refuse disposal	Mar., 17
Water supply	July, 7

Issue and Page

Bremerton, Wash.
Water supply ..... Aug., 7
Refuse disposal ..... Oct., 15
Bristol, Conn.
Unemployed—water supply ..... June, 46
Brockton, Mass.
Traffic ..... June, 74
Brookhaven, Miss.
Refuse disposal ..... Mar., 17
Brookline, Mass.
Garbage disposal ..... Jan., 76
Brown County, Wis.
Roads ..... Feb., 62
Buffalo, N. Y.
Airport ..... Jan., 11
Refuse disposal ..... Feb., 17
Fountains—lighting ..... Apr., 92
Refuse ..... May, 17
Waterfront ..... May, 61
Safety ..... Oct., 17
Welfare ..... Oct., 53
Water supply ..... Dec., 59
Burlingame, Calif.
Water meters ..... Mar., 9
Caldwell, N. J.
Tax map ..... Mar., 60
California
Highway funds ..... Oct., 11
Camden, N. J.
Highways ..... Sept., 69
Canada
Airports ..... Mar., 11
Roads ..... Apr., 11
Canton, Miss.
Water meters ..... Nov., 9
Canton, Ill.
Water meters ..... May, 9
Canton, Ohio
Safety ..... Mar., 66
Cairo, Egypt
Well ..... Sept., 9
Cedar Rapids, Iowa
Water meters ..... Apr., 9
Charleston, W. Va.
Refuse disposal ..... Sept., 15
Charlotte, Mich.
Refuse disposal ..... Feb., 17
Charlotte, N. C.
Safety ..... Mar., 19; Apr., 19
Chesterfield, England
Refuse disposal ..... Nov., 15
Chelsea, Mass.
Traffic ..... June, 75
Cherokee, Iowa
Water meters ..... June, 9
Chevy Chase, Md.
Roads ..... Feb., 11
Chicago, Ill.
Water supply ..... Feb., 7
Dump—golf ..... Feb., 68
Public schools ..... Feb., 78
World's Fair lighting ..... May, 88
Police—Fair ..... June, 17
Century of Progress ..... Sept., cover
City planning ..... Sept., 83
Snow removal ..... Nov., 53
Incineration ..... Dec., 39
Cincinnati, Ohio
Water works ..... Jan., 7
Terminal Plaza ..... May, 90
Water supply ..... June, 7
Safety islands ..... July, 73
Clearwater, Fla.
Water meters ..... May, 9
Cleveland, Ohio
Refuse disposal ..... Mar., 57
Colby, Kans.
Sewage disposal ..... May, 13
Collierville, Tenn.
Land-value tax ..... June, 58
Collingswood Park, N. J.
Highway lighting ..... Nov., 91
Colorado
Highway funds ..... Oct., 11
Columbus, Ohio
Refuse disposal ..... May, 17
Connecticut
Traffic ..... May 68
Dumps—vermin ..... Sept., 15
Highway funds ..... Oct., 11
Conshohocken, Pa.
Refuse disposal ..... June, 15
Cook County, Ill.
Swimming ..... Apr., 73
Covington, Ky.
Water meters ..... Aug., 9
Cranston, R. I.
Refuse disposal ..... June, 15
Dahlonega, Ga.
Water supply ..... Apr., 7
Dallas, Texas
Water mains ..... Feb., 50
Water meters ..... Dec., 9
Danvers, Mass
Water meters ..... Sept., 9
Danville, Va.
Refuse disposal ..... June, 15
Decatur, Ga.
Water meters ..... Apr., 9
Delaware
Housing ..... June, 75
Highway funds ..... Oct., 11
Denver, Colo.
Water meters ..... Feb., 9
Sewers ..... Feb., 13
Traffic ..... May, 67

Issue and Page

Denville Township, N. J.
Employment ..... Nov., 7
Des Moines, Iowa
Water meters ..... Aug., 9
Conduit ..... Dec., 11
Detroit, Mich.
Land survey ..... Jan., 81
Street lighting ..... Feb., 93; Apr., 91
Rehabilitation ..... Aug., 62
Water meters ..... Oct., 9
Public Works ..... Dec., 68
Dixon, Ill.
Dump—park ..... July, 60
Donora, Pa.
Refuse disposal ..... June, 15
Dover, N. H.
Snow removal ..... Oct., 60
Dresden, Germany
Sanitation ..... Dec., 62
Dubuque, Iowa
Safety ..... Apr., 68
Water meters ..... July, 9
Duluth, Minn.
Water meters ..... Aug., 9
Durham, N. C.
Street cleaning ..... Feb., 64
City-county consolidation ..... May, 62
East Chicago, Ind.
Snow removal ..... Nov., 52
East Cleveland, Ohio
Finance ..... May, 50
Easton, Pa.
Street lighting ..... Apr., 90
Filtration—pumping plant ..... Nov., 46
East Peoria, Ill.
Unemployment aid ..... Mar., 13
East Point, Ga.
Water meters ..... Feb., 9
East Providence, R. I.
Refuse disposal ..... June, 15
Eddystone, Pa.
Sewage plant ..... Oct., 43
Elgin, Ill.
Water meters ..... Sept., 52
Elizabeth, N. J.
Refuse disposal ..... Apr., 17
Highway ..... Nov., 49
Elkhart County, Ind.
Snow removal ..... Aug., 49
Elmhurst, Ill.
Snow removal ..... Nov., 52
Elmira, N. Y.
Home modernization ..... Mar., 65
Refuse disposal ..... Apr., 17
Ely, Minn.
Refuse disposal ..... Mar., 17
Emporia, Kans.
Water meters ..... July, 9
England
Sewage disposal ..... Apr., 13
Refuse disposal ..... Oct., 15
Englewood, N. J.
Refuse disposal ..... Apr., 17
Erie, Pa.
Sewage plant ..... Nov., 13
Estherville, Iowa
Utilities—indebtedness ..... Dec., 65
Evanston, Ill.
Street lighting ..... Mar., 87
Safety ..... Apr., 67
Fairbury, Nebr.
Water meters ..... Oct., 9
Fairport, N. Y.
Sewage disposal ..... Dec., 13
Fairview, N. J.
Refuse disposal ..... Apr., 17
Fargo, N. Dak.
Refuse disposal ..... May, 17
Faribault Co., Minn.
Paving ..... Aug., 11
Fayetteville, Ark.
Water meters ..... Mar., 9
Fergus Falls, Minn.
Water meters ..... Aug., 9
Filer, Idaho
Water meters ..... May, 9
Fitchburg, Mass.
Water meters ..... Oct., 9
Fitzgerald, Ga.
Water meters ..... May, 9
Fort Lauderdale, Fla.
Water meters ..... May, 9
Fort Wayne, Ind.
Water supply ..... May, 7
Fort Worth, Texas
Government ..... Oct., 65
Filtration and pumping ..... Dec., 47
Franklin, Mass.
Refuse disposal ..... Jan., 17
Fremont, Ohio
Refuse disposal ..... May, 17
Galveston, Texas
Refuse disposal ..... June, 15
Garden City, N. Y.
Water supply ..... Feb., 7
Water tank ..... Sept., 54
Gardner, Mass.
Refuse disposal ..... Jan., 17
Garrett, Ind.
Lighting ..... May, 90
Geneva, Ill.
Water supply ..... Feb., 7
Refuse disposal ..... May, 17
Georgia
Highway funds ..... Nov., 64
Glencoe, Ill.
Water supply ..... July, 7

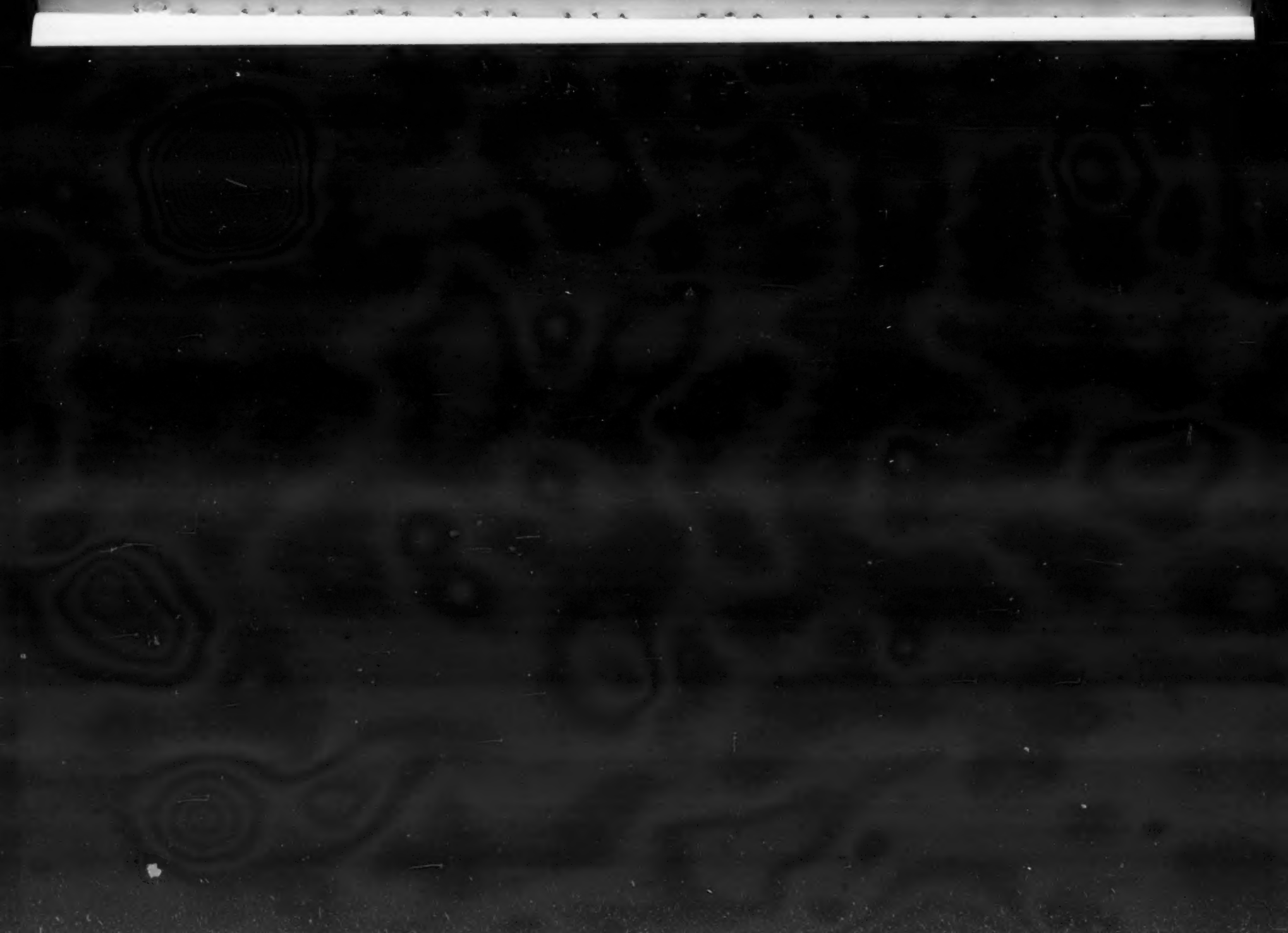
Issue and Page

Glendale, Calif.
Bridge ..... Feb., 57
Glendive, Mont.
Water meters ..... Oct., 9
Glen Ridge, N. J.
Unemployment aid ..... Mar., 7
Grand Haven, Mich.
Refuse disposal ..... Feb., 17
Grass Valley, Calif.
Pavement ..... Apr., 49
Great Britain
Traffic ..... Jan., 83
Taxation ..... Oct., 39
Greenville, Miss.
Water works ..... Mar., 53
Grosse Pointe Park, Mich.
Refuse disposal ..... Mar., 17
Guttenberg, N. J.
Refuse disposal ..... Apr., 17
Hackensack, N. J.
Water meters ..... Aug., 7
Water impurities ..... Nov., 44
Hagerstown, Md.
Sludge treatment ..... Nov., 57
Hamilton, Ont.
Refuse disposal ..... Mar., 17
Hammond, Ind.
Water meters ..... June, 9
Hartford, Conn.
Water revenue ..... Jan., 59
Hastings, Mich.
Water meters ..... Oct., 9
Havre, Mont.
Refuse disposal ..... Mar., 17
Holland, Mich.
Sewage disposal ..... Aug., 13
Hempstead, N. Y.
Refuse disposal ..... Feb., 17; May, 17
Henderson, N. C.
Refuse disposal ..... May, 17
Henryetta, Okla.
Water meters ..... Dec., 9
Hibbing, Minn.
Refuse disposal ..... Mar., 17
Hingham, Mass.
Refuse disposal ..... Jan., 17
Hollywood, Calif.
Water supply ..... Jan., 9
Houston, Texas
Streets ..... Jan., 47
Refuse disposal ..... June, 15
Hudson County, N. J.
Water supply ..... Apr., 7
Huntington, N. Y.
Hospital ..... Nov., 61
Huron, S. Dak.
Sewage disposal ..... May, 39
Idaho
Highway funds ..... Oct., 11
Illinois
Sales tax ..... June, 72
Water and sewerage bonds ..... Sept., 61
Independence, Kans.
Water meters ..... July, 9
Indiana
Sewerage ..... Feb., 13; Aug., 40
Road-mix ..... Aug., 50
Safety ..... Oct., 17
Highway funds ..... Nov., 64
Indianapolis, Ind.
Water supply ..... Jan., 50
Water meters ..... July, 9
Manhole covers ..... Nov., 11
Water supply ..... Dec., 7
Iowa
Conservation plan ..... June, 73
Water supply ..... Aug., 7
Ironton, Ohio
Refuse disposal ..... May, 17
Ironwood, Mich.
Water meters ..... Nov., 9
Islip, N. Y.
Refuse disposal ..... Sept., 15
Ithaca, N. Y.
School—finance ..... Mar., 61
Jackson, Mich.
Water meters ..... Nov., 9
Jackson, Miss.
Street cleaning ..... Jan., 53
Fire display ..... Jan., 81
Water meters ..... Nov., 9
Jacksonville, Fla.
Water meters ..... Mar., 9
Jacksonville, Texas
Refuse disposal ..... June, 15
Taxation ..... Nov., 66
Janesville, Wis.
Leisure time ..... May, 61
Jersey City, N. J.
Viaduct ..... Jan., 102; Feb., 92
Refuse disposal ..... Apr., 17
Viaduct lighting ..... May, 90
Johnstown, Pa.
Finance ..... Jan., 80
Park ..... July, 44
Jonesboro, Ark.
Water meters ..... Mar., 9
Kalamazoo, Mich.
Public works program ..... Sept., 50
Water meters ..... Nov., 9
Kansas
Finance ..... May, 50
Housing ..... Sept., 73
Highway funds ..... Oct., 11
Kansas City, Kans.
Water meters ..... Sept., 9

Issue and Page

Kansas City, Mo.
Highway map ..... Mar., 66
Safety ..... June, 17
Water meters ..... Nov., 9
Kearney, N. J.
Trees ..... Feb., 53
Kennett Square, Pa.
Snow removal ..... Dec., 60
Kenosha, Wis.
Refuse disposal ..... Apr., 61
Ketchikan, Alaska
Water supply ..... Jan., 9
Kingsport, Tenn.
Water supply ..... Feb., 44
Refuse disposal ..... June, 15
Lake Worth, Fla.
Water meters ..... May, 9
Lancaster, N. Y.
Sewerage ..... Oct., 13
Lancaster, Ohio
Water supply ..... Dec., 41
Lancaster, Pa.
Stand-pipe ..... Jan., 7
Lawrence, Kans.
Water meters ..... Aug., 9
Water supply ..... Nov., 7
Leipzig, Germany
Sanitation ..... Dec., 62
Lewiston, Idaho
Water meters ..... May, 9
Lexington, Mass.
Refuse disposal ..... Jan., 17
Lexington, Miss.
Water meters ..... Nov., 9
Lincoln, Nebr.
Water supply ..... June, 7
Linton, Ind.
Water meters ..... Apr., 9
Litchfield, Ill.
Water supply ..... Mar., 7
Little Falls, Minn.
Refuse disposal ..... Mar., 17
London, Ont.
Sewage ..... Feb., 54
Long Beach, Calif.
Auditorium ..... Apr., cover; 63
Longmeadow, Mass.
Town Hall ..... Sept., 51
Longmont, Colo.
Recreation ..... Mar., 52
Water meters ..... May, 9
Los Angeles, Calif.
Pedestrian flow ..... Jan., 82
Playground ..... Mar., 64
Park ..... Apr., 45
Child safety ..... Apr., 65
Reservoir ..... May, 7
Refuse disposal ..... May, 55
Traffic school ..... July, 63
Highway ..... Aug., 9
Street cleaning ..... Aug., 11
Planning ..... Sept., 44
Traffic ..... Oct., 70
Water bills ..... Nov., 7
Los Angeles County, Calif.
Traffic ..... Mar., 69
Louisville, Ky.
Water meters ..... June, 9
Lufkin, Texas
Refuse disposal ..... June, 15
Lynchburg, Va.
Refuse disposal ..... June, 15
Lynn, Mass.
Refuse disposal ..... Jan., 17
Macon, Ga.
Motorcycle police ..... Sept., 65
Madisonville, Ky.
Water meters ..... Sept., 9
Magdeburg, Germany
Sanitation ..... Dec., 62
Maine
Macadam surfacing ..... Nov., 42
Highway funds ..... Nov., 64
Malvern, Ark.
Water meters ..... Apr., 9
Marshfield, Ore.
Water supply ..... Jan., 9
Maryland
Highway funds ..... Nov., 64
Mason City, Iowa
Paving; scrip ..... Nov., 54
Massachusetts
Municipalities audited ..... Aug., 64
Maynard, Mass.
Refuse disposal ..... Jan., 17
McKeesport, Pa.
Finance ..... June, 71
Meadville, Pa.
Pavement ..... Jan., 55
Brick streets ..... Feb., 11
Water meters ..... Dec., 9
Memphis, Tenn.
Water meters ..... Dec., 9
Mercedes, Texas
Refuse disposal ..... June, 15
Mercer County, N. J.
Planning ..... Feb., 69
Mexico, N. Y.
Snow removal ..... Dec., 57
Mexico City, Mexico
Police ..... Apr., 42
Miami, Fla.
Airports ..... Jan., 63
Miami Beach, Fla.
Water meters ..... Apr., 9
Michigan
Taxation ..... June, 72
Highway funds ..... Nov., 64

	Issue and Page
Middletown, Conn.	
Water meters	Feb., 9
Midland, Mich.	
Streets	May, 46
Miles City, Mont.	
Water meters	Nov., 9
Milwaukee, Wis.	
Work-relief	Jan., 81
Water supply	June, 7
Garbage disposal	Oct., 49
Mineola	
Highway signs	Oct., 69
Police	Nov., 17
Minneapolis, Minn.	
Pavement	Jan., 11
Water tower	Mar., 54
Streets	Apr., 11
Refuse disposal	Sept., 57
Minnesota	
Governmental costs	Oct., 66
Highway funds	Nov., 64
Mishawaka, Ind.	
Sewerage	July, 13
Mississippi	
Highway funds	Nov., 64
Missouri	
Planning conference	Feb., 56
Highway funds	Oct., 11
Mobile, Ala.	
Water meters	May, 9
Monessen, Pa.	
Refuse disposal	June, 15
Monroe, Mich.	
Refuse disposal	Mar., 17
Monroe, N. C.	
Refuse disposal	May, 17
Monroe County, N. Y.	
Highways	Mar., 68
Montana, Canada	
Roads	Sept., 11
Highway funds	Oct., 11
Montclair, N. J.	
Planning	Feb., 69
Montpelier, Idaho	
Water meters	May, 9
Montreal, Que.	
Traffic	Aug., 65
Moorhead, Minn.	
Refuse disposal	Mar., 17
Morganfield, Ky.	
Water meters	Oct., 9
Morgantown, W. Va.	
Refuse disposal	Sept., 15
Morristown, N. J.	
Refuse disposal	Apr., 17
Munhill, Pa.	
Refuse disposal	June, 15
Muskegon, Mich.	
Garbage disposal	Dec., 61
Nassau County, N. Y.	
Police	Nov., 17
Nebraska	
Highway funds	Oct., 11
Neodesha, Kans.	
Light and water	Sept., 57
Nevada	
Highway funds	Oct., 11
Newark, N. J.	
Water	Jan., 9
Viaduct Jan., 102;	Feb., 92
Refuse disposal	Apr., 17
Viaduct lighting	May, 90
Sewers	Sept., 13
Highway	Nov., 49
Taxation	Dec., 58
Newark, Ohio	
Sewers	June, 13
New Bedford, Mass.	
Water meters	June, 9
Newburgh, N. Y.	
Refuse disposal	May, 17
New Castle County, Del.	
Sewerage	Apr., 60
New Hampshire	
Highway funds	Oct., 11
New Jersey	
Housing	Apr., 5
Safety	May, 19
Tax delinquents	Nov., 41
Leisure time	Nov., 67
New Mexico	
Highway	Oct., 11
New Orleans, La.	
Unemployed—roads	June, 70
Newport, R. I.	
Refuse disposal	June, 15
Newport News, Va.	
Refuse disposal	Sept., 15
New Rochelle, N. Y.	
Refuse disposal	Dec., 15
Newton, Mass.	
City Hall	Jan., 86
Safety alarm	Mar., 67
New York City	
Emergency work	Feb., 70
Lighting subway yard	Mar., 89
Slums	Apr., 5
Grand Central Parkway	Apr., 92
Street accidents	May, 19
Grand Central Parkway	May, 36
Planning	May, 62
Housing	June, 69
Swimming	Aug., 15
Snow removal	Sept., 54
Land economies	Sept., 68
Housing	Sept., 73
Finance broadcasts Oct., 41;	Nov., 48
Housing	Nov., 67
Housing—Health	Dec., 49
New York Region	
Express highways July, cover,	40
New York State	
Criminology	Feb., 71
Fire training	Apr., 19
Radio series	Apr., 68
Tax	June, 72
Road oiling	Sept., 11
Highway funds	Nov., 64
Niles, Mich.	
Refuse disposal	Mar., 17
Normal, Ill.	
Water supply	Aug., 48
Norris, Tenn.	
Public works	Dec., 67
North Bergen Co., N. J.	
Water supply	Apr., 7
North Carolina	
Highway funds	Oct., 11
North Dakota	
Highway funds	Nov., 64
Norwood, Mass.	
Safety	Apr., 68
Oakland, Calif.	
Cascades	Apr., 91
Oak Park, Ill.	
Sidewalks	Apr., 11
Sewers	Aug., 13
Public works	Dec., 11
Refuse disposal	Dec., 15
Ohio	
Sewage disposal	May, 13
Traffic signals	June, 17
Highway funds	Oct., 11
Housing	Oct., 63
Oklahoma	
Fire training	Jan., 19
Government talks	Jan., 86
Oklahoma City, Okla.	
Refuse disposal	May, 17
Onondaga County, N. Y.	
Highway	Oct., 61
Highway	Nov., 11
Ontario County, N. Y.	
Highways	Dec., 11
Oslo, Norway	
Safety	Mar., 19
Ottawa, Ont.	
Water supply	July, 7
Palto Alto, Calif.	
Water meters	Apr., 9
Paris, France	
Illuminated crossings	May, 68
Planning	Sept., 63
Parma, Ohio	
Refuse disposal	May, 17
Pasadena, Calif.	
Water supply	May, 7
Pennsylvania	
Roads	May, 53
Highway funds	Oct., 11
Perth Amboy, N. J.	
Park improvement	Sept., 64
Peru, Ind.	
Water supply	Apr., 7
Petersburg, Va.	
Water meters	May, 54
Philadelphia, Pa.	
Water supply	Aug., 53
Housing	Sept., 73
Traffic	Dec., 69
Phoenix, Ariz.	
Water meters	Mar., 9
Pittsburgh, Pa.	
Traffic	Jan., 82
Allegheny Co. airport	Feb., 94
Traffic	Mar., 69
Safety	Apr., 67
Plattsburg, N. Y.	
Snow removal Nov., 52;	Dec., 57
Pontiac, Mich.	
Refuse disposal	Mar., 17
Port Jervis, N. J.	
Highway	Sept., 11
Relief—paving and lighting Dec., cover,	45, 87
Portland, Ore.	
Finance	Mar., 51
Incinerator	Aug., 55
Portsmouth, Ohio	
Flood wall	Aug., 42
Providence, R. I.	
Survey	June, 71
Water supply	Dec., 7
Queens Co., N. Y.	
Boulevard	Aug., 63
Quincy, Mass.	
Refuse disposal	Jan., 17
Water meters	Oct., 9
Quincy, Mass.	
Refuse disposal	Jan., 17
Racine, Wis.	
Refuse disposal	Sept., 15
Raton, N. Mex.	
Refuse disposal	Apr., 17
Rayne, La.	
Water meters	Oct., 9
Reading, Pa.	
Water supply	Mar., 45
Red Bank, N. J.	
Refuse disposal	Apr., 17
Redlands, Calif.	
Water meters	Apr., 9
Red Wing, Minn.	
Parks	Jan., 80
Rensselaer, N. Y.	
Bridge	Aug., 11
Rhode Island	
Highway signs	Oct., 69
Richmond, Va.	
Water	Oct., 7
Water meters	Dec., 9
Ridgewood, N. J.	
Water supply	June, 41
Roanoke, Va.	
Refuse disposal Feb., 52;	Mar., 63
Rochester, Minn.	
Refuse disposal	Mar., 17
Water meters	Oct., 9
Rochester, N. Y.	
Safety	Apr., 67
Refuse disposal	May, 17
Traffic	July, 63
Rock Island, Ill.	
Water meters	June, 9
Roselle Park, N. J.	
Refuse disposal	Apr., 17
Roswell, N. Mex.	
Water meters	Dec., 9
Rutherford, N. J.	
Refuse disposal	Apr., 17
St. Louis, Mo.	
Public safety	Feb., 19
Water waste	May, 7
St. Paul, Minn.	
City Hall and Courthouse	Jan., 79
City Hall floodlighting	Jan., 102
Water supply	Mar., 7
Water meters	Aug., 9
Street lighting	Sept., 97
CWA funds	Dec., 73
Salt Lake City, Utah	
Refuse disposal	June, 15
Snow removal	Oct., 59
San Diego, Calif.	
Illuminated fountain	May, 89
Refuse disposal	Nov., 11
Chamber of Commerce, Boy Scouts and NRA	Nov., 62
San Francisco, Calif.	
Water meters	Mar., 9
San Mateo County, Calif.	
County government	Jan., 69
Santa Barbara, Calif.	
Planning	May, 58
Savannah Beach, Ga.	
Beach protection	June, 71
Schenectady, N. Y.	
Filters	Feb., 13
Lighting	July, 81
Sewerage	Dec., 55
Scituate, Mass.	
Pipe line	Oct., 54
Selma, Ala.	
Water meters	Feb., 9
Water works	Mar., 41
Sheboygan, Wis.	
Storage tank	Sept., 39
Boulevard planting	Sept., 63
Snow removal	Oct., 59
Incinerator	Nov., 50
Water meters	Dec., 9
Shrewsbury, Mass.	
Refuse disposal	Jan., 17
Sidney, Mont.	
Water meters	Oct., 9
Sing Sing, N. Y.	
Radio	Oct., 17
Sioux City, Iowa	
Water meters	July, 9
Refuse disposal	Dec., 15
Somerville, Mass.	
Refuse disposal	Jan., 17
Southbridge, Mass.	
Refuse disposal	Jan., 17
South Carolina	
Highways May, 11;	July, 56
South Dakota	
Highway funds	Oct., 11
Southington, Conn.	
Water meters	Mar., 9
South Orange, N. J.	
Street department	Nov., 61
Spokane, Wash.	
Refuse disposal	Sept., 15
Snow removal	Oct., 60
Springfield, Ill.	
Water supply	Feb., 7
Public safety	Feb., 19
Pavement	Mar., 47
Springfield, Mass.	
Zoning—assessment	Feb., 65
Dump	June, 70
Statesville, N. C.	
Refuse disposal	May, 17
Staunton, Va.	
Water supply	June, 65
Sterling, Mass.	
Roads	July, 11
Streator, Ill.	
Snow removal	Nov., 53
Sturgis, Mich.	
Refuse disposal	Mar., 17
Sydney, Australia	
Asphalt plant	Mar., 11
Tacoma, Wash.	
Employment	Jan., 13
Fire	Nov., 17
Talladega, Ala.	
Water meters	May, 9
Tampa, Fla.	
Water meters	Apr., 9
Tennessee	
Highway funds	Nov., 64
Tennessee Valley Region	
Development of	Sept., 77
Electric rates... Oct., 66;	Dec., 56
Texas	
Highway funds	Nov., 64
Thomasville, Ga.	
Water meters	May, 9
Titusville, Pa.	
Unemployment aid	May, 63
Tokyo, Japan	
Street trees	Sept., 59
Toledo, Ohio	
Museum	Apr., 65
Refuse disposal	May, 17
Toronto, Ont.	
Sewerage	Aug., 13
Street cleaning	Dec., 11
Tucson, Ariz.	
Water meters	Feb., 9
Tulsa, Okla.	
Government economy	Feb., 67
Tupelo, Miss.	
Refuse disposal	Mar., 17
Turtle Creek, Pa.	
Bridge	Jan., 102
Two Rivers, Wis.	
Fire house	Apr., 64
Union, N. J.	
Roadway	Sept., 70
Union County, N. J.	
Trees	June, 54
Upper Darby, Pa.	
Recreation	Dec., 65
Utah	
Highway funds	Oct., 11
Uxbridge, Mass.	
Refuse disposal	Jan., 17
Vandergrift, Pa.	
Refuse disposal	June, 15
Vermont	
Highway funds	Oct., 11
Vienna, Austria	
Views	Aug., 52
Virginia	
Radio	Mar., 41
Wabash, Ind.	
Lincoln statue Feb., cover;	75
Waltham, Mass.	
Refuse disposal	Jan., 17
Washington, D. C.	
Pavement	Jan., 11
Traffic Jan., 82;	May, 67
Illuminated fountain	May, 89
Roadside development	Oct., 65
Motorcycle police	Nov., 60
Handkerchief map	Nov., 77
Lyons Mill Bridge	Dec., 66
Washington Suburban Sanitary District, Md.	
Water meters	Sept., 9
Washington, Ind.	
Water meters	Apr., 9
Washington, Mo.	
Sewer	Mar., 13
Washington	
Highway funds	Oct., 11
Washtenaw County, Mich.	
Roads	July, 51
Wayne County, Mich.	
Unemployment aid	Nov., 11
Wayne County, N. Y.	
Highways	Dec., 11
Weiser, Idaho	
Water meters	Apr., 9
Wellesley, Mass.	
Summer Institute	May, 57
Wellsburg, W. Va.	
Water supply	May, 43
Refuse disposal	Sept., 15
Westchester County, N. Y.	
Trafficway	Mar., 59
West Essex, England	
Town planning	July, 52
Westfield, Mass.	
New bridge and viaduct	Oct., 87
Weston, W. Va.	
Sewage	July, 47
West Virginia	
Highway funds	Oct., 11
Weymouth, Mass.	
Refuse disposal	Jan., 17
Wichita, Kans.	
Safety	Apr., 67
Traffic	July, 59
Williams, Ariz.	
Water meters	May, 9
Wilmette, Ill.	
Refuse disposal	Dec., 15
Wilmington, Del.	
Water supply	Feb., 60
Sewage disposal	Sept., 45
Wilson, N. C.	
Refuse disposal	May, 17
Windsor, Vt.	
Snow removal	Nov., 52
Winnetka, Ill.	
Snow removal	Dec., 57
Winter Haven, Fla.	
Highways	May, 11
Wisconsin	
Sewerage	Feb., 13
Woodbury County, Iowa	
Snow removal	Nov., 53
Wyoming	
Highway funds	Oct., 11
Yonkers, N. Y.	
Traffic survey	Sept., 70
Water supply	Oct., 7
Youngstown, Ohio	
Refuse disposal	May, 17



- - - - Index to CONTENTS, July, 1933 - - - -

The Index for the year 1933 will appear in the December issue

Accident Prevention
"So Far in 1933" 15

City and Regional Planning and Zoning
A New Deal for City and Regional Planning 5
Extraordinary Development of Express Highways in the New York Region 40
Unless Citizens Cooperate, Town Planning Cannot Fully Succeed 52
Zoning and Planning Notes 65

City Manager Government
Recent City Manager Appointments 43

Conventions
When and Where 71

Finance
Pay Delinquent Taxes by Work on County Roads 11
Federal Loans and Grants Now Available for Local Public Works and Municipal Improvements 35
How to Apply for Approval of Projects under the National Industrial Recovery Act 36
Equitable Adjustment of Charges for Treating Trade Wastes—I 45
Baltimore's Tax Savings Plan 59
The Municipal Bond Market 67

Fire Prevention and Control
Compelling Public Attention to Fire Prevention 15

Forward Steps
Items Contributed by Officials 59

Government and Administration
A Consulting and Research Service for Cities, Counties and States 43
"Listen and Learn About Your Government" 67

Health
Eliminate Weeds When You Clean Up the Block 60

Housing
Housing Features of the National Industrial Recovery Act 5

Legal Decisions
The City's Legal Rights and Duties 61

News and Illustrations
Hints for Officials 73

Outdoor Lighting
Highway Lighting by Sodium Vapor Lamps 81

Parks and Recreation
Neglected Tract Made Beautiful and Useful for $3,000 44
A Park Planned from a Dump in Dixon Along the Rock River 60
A New Cutting Blade for Lawn Mowers ... 79

Police and Prisons
What to Do With the Present Jail 15
Police Department Uses Mobile Public Address System in Traffic Education Work 59

Publications
Book and Pamphlet Notices 69

Public Works
The R. F. C. Fades Out of the Public Works Picture 5
Federal Loans and Grants Now Available for Local Public Works and Municipal Improvements 35
How to Apply for Approval of Projects under the National Industrial Recovery Act 36
Three New 6-Cylinder Trucks 77

Radio
"Listen and Learn About Your Government" 67

Sewers and Sewage Disposal
Financing a Sewer District 13
A 43-Year-Old Brick Sewer 13
Cleaning Sewage Pump Suction Wells 13
Equitable Adjustment of Charges for Treating Trade Wastes—I 45
Renovating an Institutional Sewage Disposal Plant 47
New Type Screens to Be Installed at Lancaster, Pa., Sewage Treatment Plant 75

Street Cleaning
Street Cleaning in Berlin 11

Streets and Highways
Pay Delinquent Taxes by Work on County Roads 11
Cement-Bound Macadam 11
Experimental Section of Farm Road in Massachusetts 11
Replaceable Sectional Paving for Vehicular Tunnels 37
Maintenance of County Road Equipment .. 51
Surface Treatment of Topsoil Roads 56
A Light Straight Steel Grader for Two-Horse Operation 75
A New High-Speed Tool for Dry Road Maintenance 77
An Improved Sand and Stone Spreader ... 79

Traffic
Extraordinary Development of Express Highways in the New York Region 40
Police Department Uses Mobile Public Address System in Traffic Education Work 59
What the National Traffic Safety Contest Revealed About Enforcement 62
Los Angeles' Depression Traffic School 63
Rochester Engineering Society Traffic Survey 63
News of Traffic Engineering 63
Preventing Street Loading Islands from Becoming Traffic Hazards 73
A New Type of Reflecting Traffic Sign 75
Making Night Driving Safe 77

Unemployment Relief
Planning to Avert Future Business Depressions 5
Pay Delinquent Taxes by Work on County Roads 11
Experimental Section of Farm Road in Massachusetts 11

Waste Collection and Disposal
An Attack on the Problem of the Disposal of Household Wastes—H 53

Water Supply and Water Works
Waste Control Offsets Increased Use of Water 7
Saving 700,000 Gallons Daily 7
500,000-Gallon Elevated Tank Reduces Power Consumption 32 Per Cent 7
Thawing of Frozen Services 7
Meters Check Losses 9
A Water-Supply Advertisement 9
Pumps and Their Places—II 41
Water-Softening Plants for Small Cities .. 49
An Automatic Device for Controlling Delivery Rates of Reciprocating Pumps 79

FORM FOR LOAN APPLICATIONS

for public works and municipal improvements under the National Industrial Recovery Act is reproduced on page 36.

For other important information regarding Federal Loans and grants under this new law see pages 5 and 35.

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See pages 17, 69, 71 for notices of catalogs and publications on municipal and civic subjects

For Index to Advertisements see page 86

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Public Works-Housing-City Planning

The R. F. C. Fades Out of the Public Works Picture

THE following statement was issued on June 26 by Jesse H. Jones, Chairman of the Reconstruction Finance Corporation:

"One hundred sixty-five loans totaling $217,565,383 had been granted by the Reconstruction Finance Corporation when the self-liquidating phases of the Corporation's work were turned over to the Public Works Administration at the close of business today. The loans ranged from $500 to $61,400,000 and covered 37 states.

"In transferring to the Public Works Administrator the record of all applications which the Reconstruction Finance Corporation has either deferred or declined, it is sending to the new authority projects the applications for which total more than $500,000,000.

"More than $250,000,000 is included in the loans which the R. F. C. in recent weeks has deferred for reference to the Public Works Administrator and more than $300,000,000 in those which the board, because of the limitations imposed upon it by law, had previously been forced to decline. The number of applications which were deferred for consideration by the Public Works totaled 96, and information covering 340 loans that had been declined but will also be available for consideration by the new body.

"All of the deferred or declined applications are to be transferred to the Public Works Administrator for consideration and study. The facilities and the organization of this Corporation are available to the new agency in the public works program of the President.

"The Emergency Relief and Construction Act became a law on July 21, 1932. The first loan was authorized on September 13, 1932, and the last today.

"Self-liquidating requirements prevented granting of many loans that would have served a good purpose. Every effort was made in all instances, to bring the applicants within the scope of the Act. This often required weeks of work, in which agents of the Corporation devoted as much time as those seeking the loans in perfecting the applications."

A New Deal for City and Regional Planning

THE National Conference on City Planning is calling the attention of municipal officials and planning commissions throughout the United States to an important paragraph in the statement of policy of the National Public Works Board, issued on June 22 in connection with applications for Federal loans or grants under the National Industrial Recovery Act:

"Projects which are integrated with other projects into a significant plan should be preferred to projects which are isolated and unrelated."

As a memorandum prepared by Alfred Bettman, of Cincinnati, President of the Conference, points out:

"As appears from two chapters in his book 'Looking Forward,' President Roosevelt is an enthusiast about planning, and planning is recognized by the present Federal administration as a correct method in the process of determining upon public works and their social and material values.

"Owing to local economy programs, there has been a deplorable tendency in many cities and localities to reduce the use of planning methods and the efficiency of their planning commissions. This is a false economy. The National Recovery Act with its public works provisions should be recognized as a signal for the restoration of planning commissions and planning methods to full force and vigor."

Housing Features of the National Industrial Recovery Act

UNDER Title II of the National Industrial Recovery Act, as approved by the President on June 16, 1933,* the Federal Government is authorized under certain restrictions to make loans or gifts of funds (out of the $3,300,000,000 appropriated by the Act) for the "construction, reconstruction, alteration or repair under public regulation or control of low-cost housing and slum-clearance projects."

No limit is set in the Act as to the percentage of the cost of any project which may be covered by a Federal loan, or as to the interest rate to be charged. Persumably, therefore, a Federal loan could be made available up to 100 per cent of the entire cost of any given project and at a rate as low as, or even lower than, the Government pays for the money.†

As contrasted with loans, the Act provides that "grants" (gifts) of funds shall not be in excess of 30 per cent of the cost of labor and materials employed in any project, and that such subsidy shall be restricted to "states, municipalities or other public bodies."

To carry out the purposes of the Act, the law authorizes the President to create a Federal Emergency Administration of Public Works, and the President is also empowered "to establish such agencies" as he may find necessary, and "to delegate any of his functions and powers under this title to such officers, agents, and employees as he may designate or appoint."

It would appear, therefore, that there are three alternative methods under which Federal aid for low-cost housing (with or without slum clearance) may now be secured:

1. Limited-dividend housing corporations functioning under a state law—to which loans, but not grants, can be made.

2. A Public Housing Authority, which might be created either by a state legislature or possibly by a city government—and to which loans *and* grants could be made.

3. A Federal Housing Authority with local branches, which might be set up, independently of any state or local legislation, as one of the agencies which the President is authorized by the law to create. Such an authority would also be eligible for both loans and grants.

Planning to Avert Future Business Depressions

NOW that the nation is emerging from a serious depression of nearly four years' duration, it is none too soon to plan constructive measures to avert a future similar catastrophe. Such a measure, adopted by the Pennsylvania Legislature, but vetoed by Governor Pinchot for certain technical reasons, was the subject of a luncheon on June 1 of the Permanent Committee on Unemployment of the Philadelphia Chamber of Commerce.

In the absence of the Committee's Chairman, Morris E. Leeds, the scope of this proposed Public Works Planning Bill was outlined by its chief sponsor, Otto T. Mallery. The planning was to be of two kinds—choosing the project, and finding the money. The State Public Works Planning Board was to make two kinds of plans—a six-year financial plan, and a six-year physical plan for the State Government. The proposed State Board was modeled on the Federal Employment Stabilization Board, whose work during the last two years is facilitating greatly the prompt and efficient expenditure of the Federal Government's share of the $3,300,000,000 appropriated by the National Industrial Recovery Act.

Perhaps the most important provision of the Pennsylvania bill was the authority given to create similar local public works boards by the cities. These local boards were also to make six-year physical and financial plans, and were to exercise their influence in preserving in good times some of the borrowing power of the municipalities for use in bad times. Any city which did not create such a local board would have been required to ask for an advisory opinion of the State Board before the voters of the municipality could approve a public works bond issue.

State and city officials wishing to consider the drafting of legislation along these lines can obtain a copy of the Pennsylvania bill on application to Mr. Mallery at 1427 Spruce Street, Philadelphia, Pa.

* See pages 35 and 36 of this issue.

† As this issue of THE AMERICAN CITY goes to press, it is reported that a uniform rate of 4 per cent will be charged by the Federal Government on public works and housing loans.

Look into Valve Values

Read these inside facts

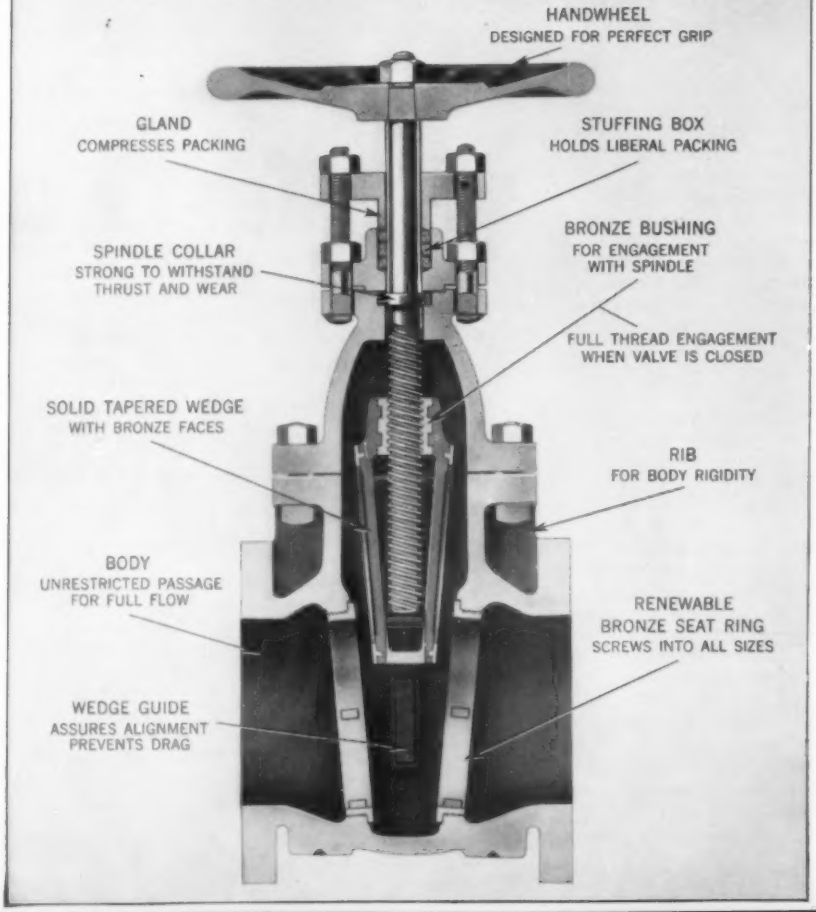
...sound reasons why you get true economy when you use Jenkins Iron Body Gate Valves

A LIFETIME of dependable valve performance marked by low upkeep is assured when Jenkins Iron Body Gate Valves are installed. Value is built into these gates . . . higher quality that brings true economy. Just check over the superior features shown in the picture. Every detail of a Jenkins Iron Body Gate Valve shows the result of the maker's intimate knowledge of valve service. Every part is designed and constructed with just one aim...to make it as fine as possible.

After each Jenkins Gate is assembled, it must prove its worth before leaving the Jenkins plant. It must undergo tests which predetermine performance. A brass "*Certified*" plate attached to the valve body assures the user that the valve has already demonstrated ability to do the job for which it was built.

You can get prompt delivery of Jenkins Iron Body Gate Valves, standard, medium and extra heavy patterns—inside and outside screw types. They are carried in stock at convenient points and may be obtained through supply houses everywhere.

Jenkins Fig. 326, Standard Iron Body Gate Valve



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Water Supply and Purification

Water Works News and Reviews

Waste Control Offsets Increased Use of Water

CHANGING living habits and the application of modern plumbing are contributing to an increased use of water by the individual, but this additional use has not increased the total consumption, including waste, to the same extent, because of the tendency toward metering and better control over the distribution system. Extension of supply facilities in municipalities has made water available in more places and for more uses such as swimming pools and fountains, and the development of small pumping systems has increased the use of water on farms and in localities where water is drawn from ground supplies.

The average city uses from 100 to 125 gallons of water per capita per day, which may be reduced or increased in accordance with the number of industries drawing on the supply and the operations of these industries. A purely residential community without industry uses 50 to 70 gallons of water per capita per day.

Where water supplies must be treated and where there is a large investment in the water plant, there is a tendency to install meters, otherwise there would be no incentive for the consumer to keep down costs and more water might be treated than was necessary. This tendency toward metering, therefore, tends to conserve water and results in greater vigilance over leaky valves and other defects in the distribution system. It may be noted that the amount of water perhaps "wasted" in the daily ablutions of the individual is not comparable to the waste incurred through loose faucets.

It has been found that where there is metering there is a reduction in the consumption of water, but the reduction is in the amount wasted rather than in the amount actually used. As a whole, therefore, there is a tendency to collective reduction in the consumption of water due to better control over wastage.

Saving 700,000 Gallons Daily

MORE than 700,000 gallons of water daily has been saved in the town of Bloomfield, N. J., by a survey of nine-tenths of the town. The daily consumption of the town is about 3,500,000 gallons. The survey, made by the Pitometer Co., of New York, revealed losses of 285,000 gallons a day through broken or leaking water mains, the remainder through broken house services.

Several months ago about 30 per cent of the water supply in Bloomfield could not be accounted for. With the authorization of the Council, the Pitometer Co. was engaged to make a survey. The contract calls for a payment of $4,500 if the company eliminates losses to that value. If a lesser loss is revealed the company is to be paid only the value of the water losses discovered based on one year's saving. The survey thus far indicates that the losses eliminated will be several times the contract price. Specific leaks revealed were 170,000 from a 6-inch main in Chapman Street; 55,000 gallons a day from a 6-inch main in Broad Street; 45,000 gallons a day from a 6-inch main in Johnson Avenue; and 15,000 gallons a day from a 6-inch main in Mill Street. This is the first survey of the local water system since its institution in 1904.

JOSEPH W. OBREITER,
Town Engineer.

500,000-Gallon Elevated Tank Reduces Power Consumption 32 Per Cent

THE village of Glencoe, Ill., reduced the power consumption in its Water Works Department 32 per cent by installing a 500,000-gallon elevated tank. During 1931 an average of 1,835 kilowatt-hours was used per million gallons pumped. For the first full six months that the tank was in operation, the average number of kilowatt-hours per million gallons was only 1,235.

The tank was built by the Chicago Bridge & Iron Works early in 1932, and after being operated during March was taken out of service for painting. It was cut back into the service on June 25 and has been in service continuously since that time.

The above comparison is based on only six full months with the tank in operation as against the figures for a full year operating without the tank. The operating efficiency during those six months, however, is remarkably uniform regardless of the variation in pumpage. With these facts in mind, it seems fair to assume that the six months' average will be a representative figure for the first twelve months. The city secured a new and lower power rate on August 1, 1932; consequently the actual power cost did not provide a direct comparison. It is interesting to note, however, that the annual savings figured according to the old rate would amount to approximately $1,788, and about $2,470 when computed at the new rate.

The Water Works Department at Glencoe, which also serves Northbrook, has a total of 2,000 domestic consumers, one industrial plant and four golf clubs. The water supply is taken from Lake Michigan, filtered and stored in a 500,000-gallon reservoir. The pumping station, which is located directly on the lake shore, equipped with one 1 mgd, one 2 mgd and one 4 mgd electrically driven centrifugal high-lift pump and one gasoline-driven stand-by unit with a capacity of 4½ mgd. The plant also includes two motor-driven low-lift pumps of 2 mgd capacity and one gasoline-driven stand-by unit of 3 mgd capacity. Throttling of low-lift as well as high-lift pumps was necessary before the elevated tank was installed, to keep the clear well as nearly full as possible, there being no other reserve.

An appreciable amount of the savings in power per million gallons pumped is due to the fact that the village now gets a higher efficiency from its pumping equipment than it did before the elevated tank was installed. It is now possible to operate one large pump for a few hours at a uniform rate and then shut it down entirely, instead of operating continuously and varying the pumping rate to meet the fluctuations in the consumption rate. The variations in water pressure recorded at the Village Hall have been ironed out since the tank was put into service.

GEORGE R. YOUNG,
Village Manager.

Thawing of Frozen Services

UNTIL a few years ago probably one of the most important questions confronting the officials of a Canadian water department was the frozen service. For instance, there have been winters in Ottawa, Ont., when services of more than 3,000 consumers have been frozen, and the Department in years past was unable to cope with this situation in a satisfactory manner. In 1919 the Department discontinued the thawing of services by the transformer method and designed and constructed four self-contained electric thawing apparatuses. The success of these new machines has been truly marvelous in rendering a prompt and efficient service as well as in having reduced the cost of each thawing operation from $6.05 per service to $1.78 per service, effecting an individual saving of $4.37 per service. Allowing for all operating costs, interest and depreciation, the thawing machines have been directly responsible for a saving of over $30,000 to date.

W. E. MacDONALD,
City Water Works Engineer,
Ottawa, Ont.

The 1933 Municipal Index, which will be published shortly, will contain up-to-the-minute statistics on the number of water meters, hydrants, etc., in the leading cities of the United States, and the amount of mains installed.

BALANCED DESIGN!

The "Plus" quality in American and Niagara Water Meters

Each part in a water meter must be well designed, finely built, if the meter is to give reasonable service. But an aggregation of fine parts is not enough to assure truly fine performance. It requires something "plus." *Balanced design* is essential!

Just as the well-rounded football team will outplay and defeat a collection of opposing stars who "play to the grandstands," so will perfect team-play of all parts in a water meter give the extra accuracy and added life that you are looking for. This you get in American or Niagara Meters.

Back of every American or Niagara Water Meter you buy today is 40 years' steady development of perfection in each part and in the balance of the whole. You can test for yourself the superior performance of American or Niagara Meters on your next meter order. Write for prices and details.

BUFFALO METER CO.

Established 1892

2902 Main Street Buffalo, N. Y.

NIAGARA (IRON CASE) and AMERICAN (BRONZE CASE) Water Meters

America's Finest Incinerator

the

PITTSBURGH (DES MOINES)

Plant

Serving the City of

Baltimore, Md.

600 Tons Daily Capacity

Material Burned Without Fuel

This incinerator destroys all of the city's garbage without the addition of commercial fuel. Enough of the rubbish, which is collected separately, is mixed with the garbage, so that the material charged into furnaces is 65% garbage and 35% rubbish by weight.

Unusually Economical Operation

Two electrically operated traveling cranes, equipped with clam shell buckets, deliver the garbage and rubbish from the receiving bin to the charging hoppers. Discharge gates, permitting the refuse to flow from the hoppers onto the furnace drying hearths are operated from the stoking floor. The combination drying hearth-burning hearth arrangement makes it possible to employ but two stokers for each of the four 150-ton units. Hoppers, under the front of the furnaces, receive the ash. One man, with truck, disposes of the ash from all these hoppers.

In all, but 14 men per shift, in addition to the plant superintendent, are required for complete and successful operation of the incinerator.

Pittsburgh-Des Moines Steel Company

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Meters Check Losses

Reports on the Services of Water Meters

Indianapolis, Ind.

THE water services in Indianapolis are now 99.1 per cent metered, the meterization program having been completed December 31, 1931. There are still a few accounts, such as private fire lines, which are unmetered, and therefore it is impossible to state that the city is 100 per cent metered. The chief value of metering in Indianapolis is the conservation of a limited supply of water and therefore the postponement of expenditures for additional capacities, with the attendant saving in carrying charges on securities issued to cover such capital improvements. Further, selling of water by measurement is undoubtedly the fairest way for the customers. Whether or not the installation of meters has actually saved in operating expenses is not known. It has eliminated the expense of obtaining and keeping records of additions to existing structures both in the number of rooms and in plumbing fixtures, as was necessary under the flat rate system, also, the expense of surveillance of customers to prevent illegal use of water, especially for lawn sprinkling, has been removed. There is of course some saving in chemicals used in purification, and in coal used for power, because of the reduced consumption. On the other hand, there is the capital expenditure in meter connections and meters, the expense of meter maintenance and replacement, and the expense of installing and removing meters as customers come onto or leave the lines. Under the flat rate system customers were billed quarterly in advance, whereas under the metered system we are reading meters and billing monthly at the end, rather than at the beginning, of the month. The Indianapolis Water Co. also maintains an inspection of customers' properties as a service to the customers in advising them of leaks which cause unduly large bills. Also, undoubtedly the monthly variation in bills attendant on measured service causes more inquiries regarding the bills than does the flat-rate service, and this takes time and causes expense in explaining the bills to the customers.

In 1904, when the population of Indianapolis was 192,000, the services were 7.3 per cent metered and the average daily consumption 82.3 gallons per capita. In 1910, the population was 240,000 and 11.1 per cent of the services were metered, and the consumption had dropped to 80.5 gallons per capita. In 1920 the population had increased to 319,800, with 13.6 per cent of the services metered, and the consumption had risen to 94.5 gallons per capita, owing to increased industrial use. In 1930 the population was 371,500, and 88.8 per cent of the services were metered, the daily consumption showing a slight decrease to 93 gallons per capita. In 1932 the population was 375,600, the per cent metered 99.1, and the consumption had dropped to 73.2 gallons per capita, due partly to the depression in business and partly to the general use of meters.—H. S. MORSE, Manager, Indianapolis Water Co.

Dubuque, Iowa

THERE is no doubt that the increased use of meters has greatly reduced the waste of water from domestic services. Often the figures given for per capita consumption are unfair to the advantages of metering for two reasons: first, they take little or no account of large industrial uses of water; and, second, the number of consumers in two cities of like sizes may be at wide variation. For example, a town of 10,000 may have very few consumers, while another town of the same population may have a great number, which would make a large difference in the average daily per capita consumption. In 1900, when there were no meters in Dubuque, it had a population of 36,300 and the estimated consumption was 85.3 gallons per capita daily. In 1910, when the population was 38,500, the domestic services were 90 per cent metered and the industrial services 100 per cent, and the consumption had dropped to 60.6 gallons per capita daily. In 1920 the population was 39,000, and the domestic services were 99 per cent and the industrial 100 per cent metered, but owing to increased industrial use of water the per capita consumption had risen to 76.4 gallons daily. In 1930, with a population of 41,678, all services were metered, and the consumption dropped to 63.5 gallons per capita daily. In 1932 with a population of 43,000 and all services metered, a further decrease of daily consumption per capita brought the figure to 56.0, owing to reduced industrial use.—J. W. MCEVOY, Superintendent, Water Department.

Sioux City, Iowa

SINCE metering began in Sioux City there has been about a 40 per cent cash saving in the operation of the Water Department due to metering. In 1932 the population was approximately 80,000, the services were 99 per cent metered, and the total daily consumption was about 6,000,000 gallons.—PHIL CARLIN, Superintendent, Water Department.

Emporia, Kans.

THE city has been 100 per cent metered for about fifteen years, but no records are available prior to 1930 of per capita consumption. In 1930 the population was 14,432 and the city 100 per cent metered, with an average daily consumption of 126 gallons per capita. In 1932, with the same population and all services metered, the consumption had dropped to 107 gallons per capita daily.—M. DUNSWORTH, Water Superintendent.

Independence, Kans.

FROM 1910 to 1920 the pumpage of water in Independence increased so that it was almost impossible to supply the demand. In 1914 the Department began metering the city, installing from 2 to 300 meters per year, and all new services are metered as they are tied in. As the number of meters increased, the pumpage decreased. In 1920 the population of Independence was 11,920. There were 200 domestic and all industrial services metered. The daily pumpage was 3 million gallons. In 1930 the population had increased to 12,782 and all domestic and industrial services were metered. The daily pumpage had dedecreased to about 2 million gallons. In 1932 with a slightly lower population of 11,658 and all services metered, the total daily pumpage has decreased to 1,750,000 gallons daily.—J. C. GORDON, Superintendent, Water Department.

Statistics on Water Meters, Hydrants and Mains will appear in the 1933 Municipal Index.

HISTORY OF WATER SUPPLY

THE CAVEMAN

LONG before the dawn of history, when life was a never ending battle against the forces of nature and only the fittest survived, the caveman had to live near stream, lake or spring, and protect his right to drink thereat against the wild beasts of the forest. This primitive human knew he could not live without water so he made his crude home where water was available, and in so doing established the first known public water supply.

Nowadays people in this city don't have to make their homes beside the water. Our modern service brings the water to you—abundant, pure and wholesome—throughout the many miles of city streets.

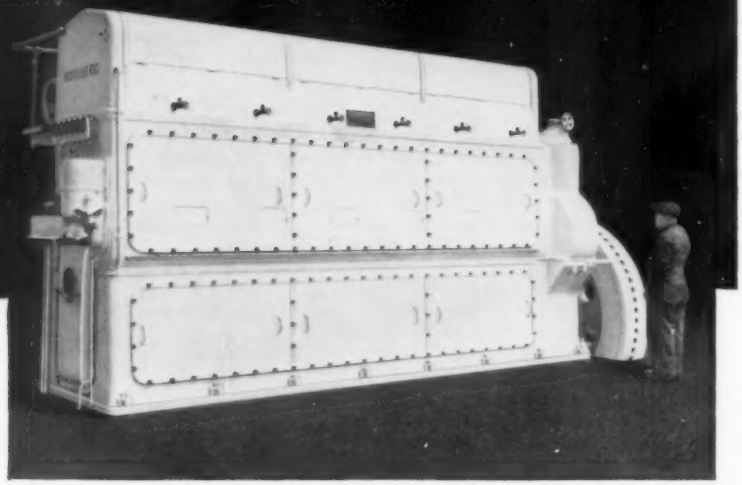
NO. 1 OF A SERIES OF WATER ADVERTISEMENTS USED IN LOCAL NEWSPAPERS BY THE AMERICAN WATER WORKS & ELECTRIC CO.

NORDBERG

Builds a Full Line of . . .

DIESEL ENGINES

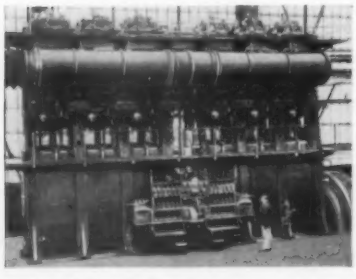
150 to 22,500 HORSEPOWER



The new four-cycle Nordberg Diesel is now available in sizes from 150 to 1,000 horsepower

Two-cycle air or mechanical injection, 750 to 2,000 horsepower

Other two-cycle types in sizes up to 5,800 horsepower



Double-acting types in units of larger size

As builders of Diesel Engines since 1913, twenty years of Diesel experience are back of this line of Nordberg Engines. Into them is built that same high standard of quality for which all Nordberg Products are so well known. It is because of this quality that they continue to be the choice of those who prefer better built equipment. With this range of sizes, there is a Nordberg Diesel that will exactly meet your requirements and give the kind of service that is appreciated by those who demand the best.

If you are considering a new Diesel unit, let a Nordberg Engineer explain the merits of this line of Diesels.

NORDBERG MFG. CO.

MILWAUKEE, WIS.

Construction and Maintenance

Engineering and Highway Departments

Pay Delinquent Taxes by Work on County Roads

THE sheriff of Rock Island County, Ill., had little occasion to sell property for taxes during 1932, for delinquent taxpayers were given a chance to work out their overdue payments on county roads. Highway jobs enabled 1.820 property owners to pay up their taxes and special assessments completely, and helped about 50 others reduce the amount of their bills. Water and gas bills, too, were worked out on the roads. In all, tax obligations amounting to more than $86,000 were wiped off the books.

Wallace Treichler, County Highway Superintendent, reports that at the start of the 1932 construction season, road jobs were given to men who applied to the county for relief. But many of these men would not do a fair day's work, since they knew they could get food and clothing without working for it from at least one of the 22 organizations in the county dispensing relief.

Then, jobs were offered to men unable to pay their taxes, who were more than glad for a chance to work. These men were paid at the rate of $4 a day, of which they received $1 in cash, and the balance was credited to their tax accounts.

More than 18 miles of new concrete pavement was laid on important county routes during 1932, most of it employing "delinquent taxpayer" labor. Although the plan was singularly successful, it is doubtful whether it can be continued in Rock Island County during 1933, because highway funds have been depleted by diversion of the county's share of gas tax revenue to unemployment relief.

Cement-Bound Macadam

CEMENT-BOUND macadam, a low-cost pavement, laid with little equipment, is the latest arrival in the secondary, light-traffic road field. Load-carrying ability at all seasons of the year is combined with low first cost and low cost of maintenance. Engineers who laid "Hassam" twenty years ago, before the patents expired, claim that cement-bound macadam is a tried and trusty friend, although modern equipment and methods have modified the design.

A cement-bound macadam road is really a layer of crushed stone bound together with portland cement mortar. Only large-sized stone is used to insure penetration of the mortar, which is mixed to the consistency of pea soup and poured over the stone. The stone is rolled before applying the mortar, to reduce voids and secure an even surface. The grouted stone is again rolled, to work the mortar between the stones and iron out the surface, and the pavement is finished by brooming or belting.

The Pennsylvania Highway Department recently finished a 1-mile section near Bath in Northampton County, to determine what the cost would be when modern machinery and methods were applied. The entire stretch was built 18 feet wide with a uniform thickness of 6 inches, except for 100 feet where the edges were made 8 inches thick. Forms were not used, but the shale and clay subgrade was trimmed to a vertical shoulder on either side. Limestone ranging in size from 1¼ to 2¾ inches was spread from stone boxes to a loose depth of 7½ inches and compacted to 6 inches by rolling. A grout was made up of one sack of cement for 200 pounds of damp sand, with 7½ gallons of water. The materials for the mortar were loaded into truck-mixers at the central proportioning plant, mixed in transit, hauled over the rolled stone and spouted directly in place in the road. A special distributor was placed on the end of the discharge chute to slow down the discharge and prevent displacement of the stone. This mix was equivalent to 4 sacks of cement per cubic yard, approximately 1:2:11 mix.

A 10-ton roller was used on the loose stone, and the final rolling, after applying mortar, was done with an 8-ton tandem roller. Small depressions were filled with stone and mortar, and final finish was given by two beltings with a burlap belt. The road was opened after curing under wet burlap for 48 hours.

The work was carried on by a day labor crew of 30 men under the Maintenance Department. From three to five truck-mixers were used over an average haul of 1¼ miles. The best day's run of grout completed 1,156 linear feet of pavement, and the average of the three best days was 1,087 feet. Total cost, determined on completion, was $9,977.25 per mile, or 94.5 cents per square yard.

Cores cut from the completed pavement showed good penetration of grout, except in one or two pockets, where fine material was known to have collected.

Three shorter sections were constructed during the past season in New Jersey and a fifth has recently been built by the New York Highway Department not far from Newburgh. Cores have shown average strengths of 3,800 pounds per square inch at 28 days. All the sections have impressed visiting engineers so favorably that considerable construction of this type is planned in 1933 for the less heavily traveled roads and streets, where construction economy is most important.

Experimental Section of Farm Road in Massachusetts

TWO experimental pieces of farm road have been constructed in Worcester County, Mass., by the town of Sterling, under the supervision of the Massachusetts Department of Public Works, at less than $10,000 per mile. The Worcester County Engineering Department furnished surveys, plans, stakes, highway layouts and bounds. The surface consists of either a state standard 8-inch compacted stone fill, 10 feet in width, or a gravel fill at least 12 inches in depth where the use of gravel proved satisfactory, and 4-foot wide gravel shoulders 6 inches deep, the hole being covered with a layer of gravel for a width of 18 feet. This was given a bituminous treatment, so that an all-weather surface was produced. This type of highway can be built for $10,000 per mile, or less when built in greater length, depending upon the condition of the existing road and upon the type of country in which the road is built.

Street Cleaning in Berlin

THE occasional statement that the streets in Berlin are "scrubbed" is literally true. A combined flusher and squeegee covers the entire surface of the street, washing and scrubbing in lanes until all refuse is at the curb. In some cases the gutter area is flushed with the squeegee, washing the dirt and water right to the edge of the inlet. A hand broom crew accompany the flusher and brush the water and dirt in the gutter to the inlets. They pick up and place in a small pushcart all accumulated débris that does not float directly into the sewer. The street is spotless after this process.

The city of Berlin is divided into twenty districts. Street cleaning in six of these is done directly by the city Department of Public Cleansing. The other fourteen maintain their own services, but under the general supervision and inspection of the central department. The refuse collection work for all the twenty districts is managed by the central department. It has been operating only since 1922. Prior to that some districts were handled by the city and others by contract.

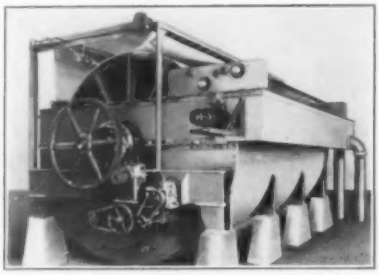
The owners of houses pay a special tax for street cleaning. The basis of this charge is the number of meters of street in front of the building. Streets are also divided into five classes, with a charge varying according to the class of street. Special taxes are also assessed for refuse collection. The cost to the house owner depends upon the number of receptacles collected from the house. For a 100-liter receptable, the cost is about 20 cents.

The lineal meter unit is employed for measuring street-cleaning work.

—From "Some Observations on Municipal Practices in European Cities," by DONALD C. STONE, published by The International City Managers' Association.

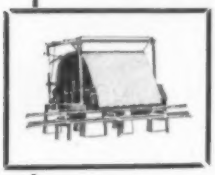
VACUUM FILTER FOR SEWAGE FILTRATION

Used for filtration of raw sewage or final effluent from other processes requiring further refinement. This filter is of the string discharge vacuum type with the greater part of the drum submerged, the object being to obtain the highest degree of clarification of sewage liquors with a high rate of flow.



One of three String Discharge Vacuum Filters for Sewage Filtration at Rockville Center, L. I.

Also Other Mechanical Sewage Equipment

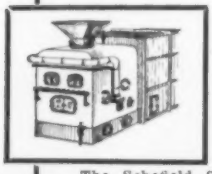


This String Discharge Vacuum Filter for Dewatering Sludge will handle all kinds of sludge—fresh, activated, digested, or a combination of sludges including fine screenings. Operation is clean, quick, economical, odorless. No manual handling of sludge required.

The combination Schofield Bar and Fine Screen here illustrated, contains both the heavy bars for rough screening and intermediate bars spaced as close as 1/16 in. for fine screening, thus offering two screens in one. Automatic, self-cleaning.

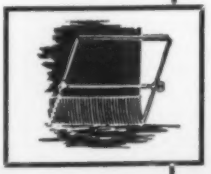
For extremely fine screening, the Riensch-Wurl Disc Type is the most efficient and reliable. It may be used as the sole means of treating sewage, or as a preliminary treatment replacing the sedimentation or primary settling tanks.

With this Pneumatic Ejector System, the entire conveying operation takes place within pressure-tight tanks and pipe lines. The motive power is compressed air. Screenings may be conveyed to drying beds located 500 to 1000 feet away, or lifted to any height required.



The Municipal-Decarie Screenings Incinerator—Water-Jacketed Type, employing the Decarie principle of suspending the refuse for predrying, above but in the fire, allows free unrestricted upward burning. This is extremely important, owing to the high moisture content of sewage screenings.

The Schofield Self-Cleaning Automatic Bar Screen here shown, can be installed to handle any amount of flow, and the bars arranged with any size openings. It is entirely automatic, self-cleaning, and has a minimum of working parts. It can be relied upon for uninterrupted service.



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MUNICIPAL SANITARY SERVICE CORP.
155 East 44th St., New York

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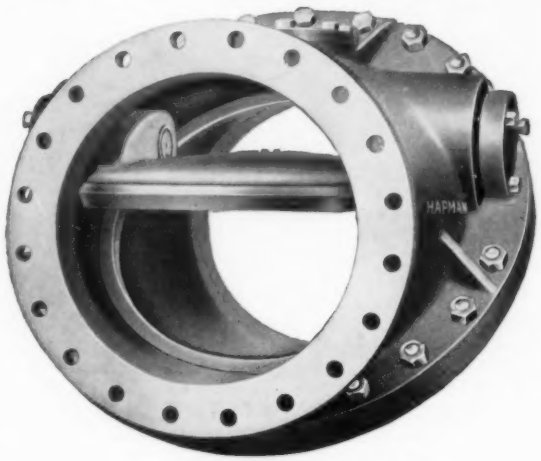
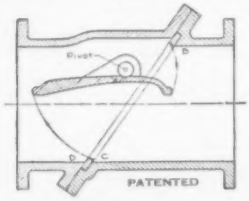


WITH A *Chapman* NON-SLAM CHECK VALVE

THERE IS no longer any reason to tolerate slamming of check valves. Chapman's new Non-Slam Check Valve, radically different in design and construction, puts an end to slamming, the cause of water hammer, heavy stresses in the pipe lines and damage to the check valves themselves.

THE CHAPMAN VALVE has a balanced disc, — a cushioning effect is obtained by forcing the short flap of this disc against the stream, dampening any tendency to slam. It closes quickly and drop-tight.



The balanced disc, supported on two bearings, reduces head loss 75%, does not flutter, eliminates excessive wear

The many advantages of the Chapman Non-Slam Check Valves are fully described in an illustrated booklet that we will be glad to send you on request. *Write for it today.*

THE CHAPMAN VALVE MANUFACTURING CO.
INDIAN ORCHARD, MASSACHUSETTS

Treatment Conserves Health

SEWERAGE and SEWAGE DISPOSAL

Financing a Sewer District

THE sewage treatment plant at Atlantic Beach, N. Y., together with about 8 miles of mains and laterals, was built by a private corporation and placed in service in 1927 to serve an existing population of some 500. In 1930, the residents of Atlantic Beach petitioned the Town Board to create a sewer district and to purchase the existing system for the sum of $321,000. After the District was established and the Commissioners were appointed by the Town Board, it became necessary to extend the then existing sewer system to the easterly portion of the district, where 310 houses were then built. The extension of this system called for the laying of 9 miles of mains and laterals, bringing the total of mains and laterals to 17 miles at the present time; comprising 13 miles of 8-inch and 2 miles of 15-inch sub-mains and 2 miles of 20-inch trunk. It is estimated that these sewers will be sufficiently large for at least 20 years. The present population reaches a maximum of 5,000 during the months of June to October, decreasing to about 1,500 for the rest of the year.

When this system was extended, bonds to the amount of $207,000 were sold to pay for the improvements. It became the duty of the Sewer Commissioners to formulate some plan of taxation whereby each parcel of land in the district would bear a proportionate share which that parcel derived from the operation and maintenance of the sewer system. It was determined that the only fair taxation for a particular district would be based on area, and not on lineal feet or assessed valuation. It was further determined that there should be a difference in classification between unsewered and sewered areas, because the law provides that in the future when a lateral is built the property owners abutting thereon shall bear the entire expense. The Commissioners arrived at a difference of 10 cents per square foot allowance, and expect to maintain that difference until they feel that both areas are on an equal footing, when a uniform rate will prevail. The interest on bonds being fixed, the Commissioners have no discretionary power, but the duty is imposed upon them simply of assessing that amount upon the lands according to benefit.

The Commissioners felt that the people using the sewers should stand the entire expense of operation, actually adopting the principle used by all public utility companies in arriving at some plan whereby the people using the sewers pay only to the extent to which the sewers are used. In doing so they deem that a tax on the number of outlets on each piece of property would be a fair manner of arriving at that tax, since there are many small houses, apartment houses and hotels in the district. A graduated schedule was therefore set up, fixing a tax on the number of outlets on each piece of property. Rates adopted and in force for two years are as follows:

Outlets	Rate per Year
1-10	$10
11-25	20
26-50	40
51-75	60
76-100	90
101-150	125
151-200	170
201-300	200
301-500	350
500-1,000	500

For the year 1932, taxes for the interest on outstanding bonds and amortization amounted to 26 cents per 100 square feet in sewered areas, and 15½ cents in unsewered areas.

—From a paper presented by GEORGE NESBIT, Superintendent of Sewers, Atlantic Beach, N. Y., before the New York State Sewage Works Association.

A 43-Year-Old Brick Sewer

THE first sewer constructed in Mishawaka, Ind., about 1890, was of the circular brick type. Of late years it has been a constant worry to the city administration. In 1931 two failures occurred due to heavy rains overloading the sewer; bricks were washed out of place, allowing the water to undermine the roadway. In one instance a citizen narrowly escaped serious injury when his automobile crashed through the pavement. In five years the city had expended approximately $15,000 for repairs on this sewer, which serves the greater part of Mishawaka. In the summer of 1931, the Board of Public Works ordered the City Engineering Department to make an inspection of the entire sewer to determine its condition definitely and to make a report with recommendations. The inspection revealed that the bricks were in good condition, but the mortar in the joints was very much deteriorated, and in many instances had disappeared.

It was recommended that a 1-inch lining of reinforced concrete be placed on the inside of the sewer by the Gunite method, which would refill the joints and stabilize the brick. Estimates were made showing that the cost of repair would be about $11,000, whereas the cost of constructing a new sewer would amount to approximately $150,000. About one-third of this amount would be spent in replacing the pavement, whereas by the former method it would be possible to reline the entire sewer without disturbing one square yard of pavement and with no hindrance to traffic.

A contract was awarded to the National Gunite Contracting Co., Chicago, Ill., in January, 1932. Work was started the first of February and completed about the first of April, 1932. Approximately forty men were steadily employed during the entire reconstruction. All materials were purchased in Mishawaka, local labor was used where possible, and the payroll amounted to more than $1,000 per week.

The course of the sewer is through two railroad rights-of-way, and under a factory, but train traffic was at no time halted during the course of the reconstruction. Five pumps were used to bypass the water and sewage, since the sewer is a combined storm and sanitary unit. Owing to the size of the sewer, which varied from 36 to 48 inches, very trying conditions were encountered, but perseverance and hard work made it possible to complete the work in quick time. Cities confronted with this problem will do well to investigate this method of reconstructing old brick sewers. The air compressors and cement guns used in doing this work may be leased or purchased, enabling cities to do their own work and use local unemployed labor.

FRANK J. MILLER,
City Engineer.

Cleaning Sewage Pump Suction Wells

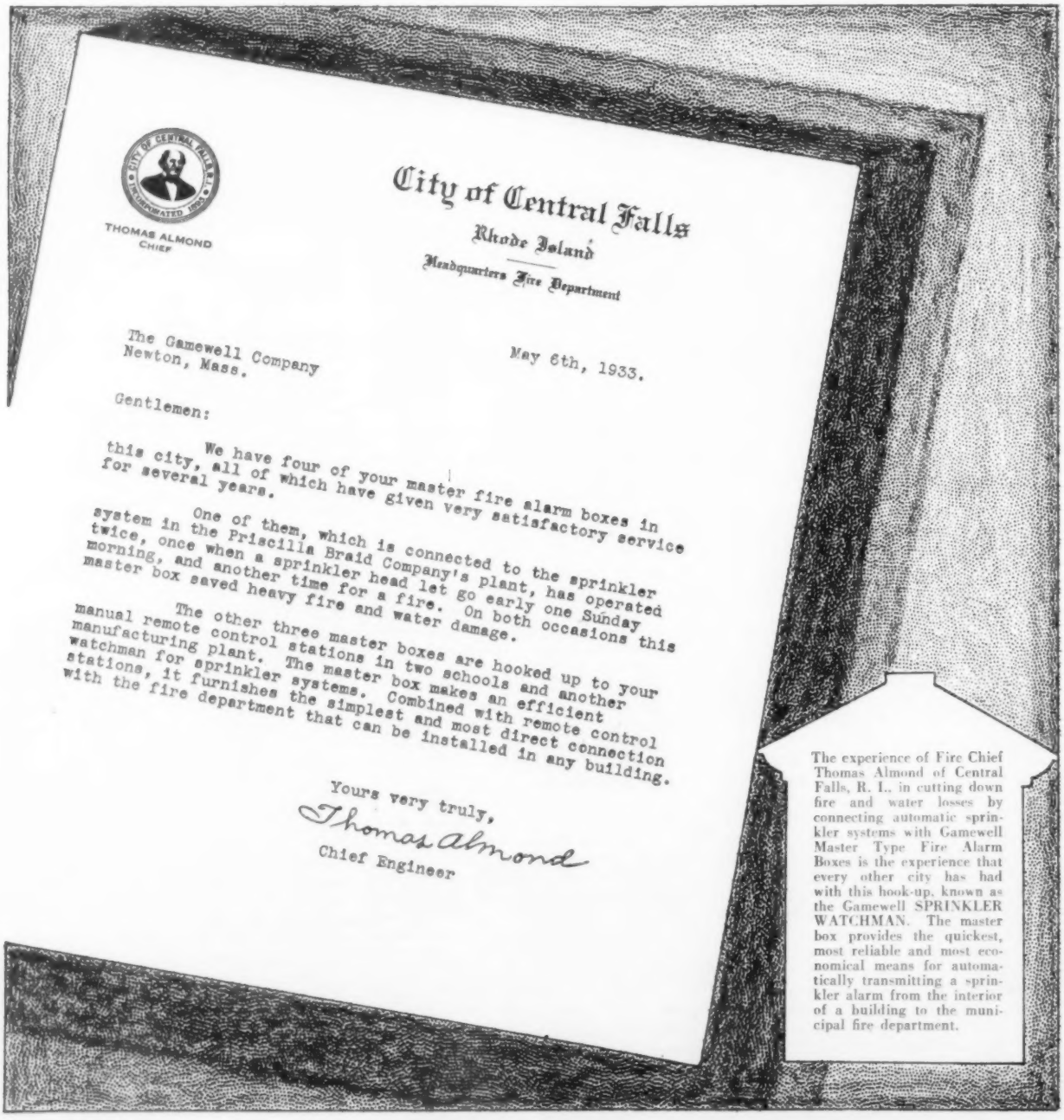
CLEANING pump suction wells is by no means a pleasant task, especially decomposition has taken place. The obnoxious odors are chiefly caused by hydrogen sulphide, and unless the wells are cleaned periodically they continue to be a nuisance and a source of complaint. The apparent cause for this condition in some instances is in the layout of the wet well. Where the well floor has little or no slope toward the suction sumps or pipes, organic and inorganic matter will rest where it settles; and unless the suction pipes are located at a proper elevation with respect to the floor, an unintentional settling chamber is created, particularly if the pipes are placed too high. Dead ends or pockets in wet wells allow the sewage to settle and become septic.

To help eliminate this nuisance, adequate provisions should be made for the cleaning of such wells. Easy access to all parts, ample ventilation and light are essential to perform this task. Flushing connections at convenient locations or stationary spray pipes assist in pushing settled solids toward the suction pipes or sumps, especially where steep slopes or hoppers are not provided. Sufficient manholes, step-irons or ladders, and walkways are exceedingly useful and their cost is small compared to the convenience they offer to those assigned to clean the wells.

E. BENDER.

Proof from another Fire Chief!

Master Box Connection to Sprinkler System Cuts Fire and Water Loss at Central Falls, R. I.



THOMAS ALMOND
CHIEF

City of Central Falls
Rhode Island
Headquarters Fire Department

The Gamewell Company
Newton, Mass.

May 6th, 1933.

Gentlemen:

We have four of your master fire alarm boxes in this city, all of which have given very satisfactory service for several years.

One of them, which is connected to the sprinkler system in the Priscilla Braid Company's plant, has operated twice, once when a sprinkler head let go early one Sunday morning, and another time for a fire. On both occasions this master box saved heavy fire and water damage.

The other three master boxes are hooked up to your manual remote control stations in two schools and another manufacturing plant. The master box makes an efficient watchman for sprinkler systems. Combined with remote control stations, it furnishes the simplest and most direct connection with the fire department that can be installed in any building.

Yours very truly,
Thomas Almond
Chief Engineer

The experience of Fire Chief Thomas Almond of Central Falls, R. I., in cutting down fire and water losses by connecting automatic sprinkler systems with Gamewell Master Type Fire Alarm Boxes is the experience that every other city has had with this hook-up, known as the Gamewell SPRINKLER WATCHMAN. The master box provides the quickest, most reliable and most economical means for automatically transmitting a sprinkler alarm from the interior of a building to the municipal fire department.

THE GAMEWELL COMPANY

"A Box A Block"

NEWTON, MASSACHUSETTS

Fire—Prisons—Safety

Items for Departments of Public Safety

POSTER BY BOWMAN MARTIN, EAST HIGH SCHOOL, WICHITA, KANS.

Compelling Public Attention to Fire Prevention

THE posters reproduced on this page were entered in the Fire Prevention and Clean-Up Poster Contest held at the convention of the National Fire Protection Association in Milwaukee, Wis., May 29-June 1, 1933, by High School pupils. The concentration on the vital issue of fire prevention which such contests require is of considerable value in vitalizing the purposes of pupils and parents.

"So Far in 1933"

"ACCIDENT FACTS"—the 1933 edition — contains statistical reports on the various divisions of the work of the National Safety Council.* Of particular interest is the summary of what has been accomplished this year up to June 1.

All Accidents. — In the first four months of 1933 there were 12 per cent fewer accidental deaths in 40 cities reporting to the Council, than in the same period of 1932. If this decline was nation-wide, the four months' saving amounts to approximately 3,000 lives.

Motor-Vehicle Accidents. — Motor-vehicle fatalities from January to April, 1933, are estimated at 8,300, compared with 8,930 for the same period of 1932. The favorable differential, however, is growing less each month. At the end of February, 1933, deaths were 12 per cent below 1932, and at the end of March, 10 per cent. Gasoline consumption figures are available only for January, February and March, indicating a decline of 5.1 per cent from the first three months of 1932. Sixteen reporting states had practically as many deaths in the first four months of this year as during the same period of 1932. Cities, therefore, are responsible for the improvement that has occurred.

Reductions in occupational and in railway accidents also are reported.

"The rest of the year?" asks the National Safety Council: "The accident experience for all of 1933 will depend largely upon the course of business from now on. Increasing employment and increasing travel will most certainly increase the number of occupational and motor-vehicle accidents. It is to be hoped, however, that the safety movement will meet the challenge by keeping the accident increases less than the prosperity increases."

*64 pp.; tables, charts. Apply to the National Safety Council, 20 North Wacker Drive, Chicago, Ill. Single copies will be sent to any public official and business organization on request; quantities available at printing cost to any organization desiring to distribute them.

What to Do With the Jail

"IF anyone is a firm believer in the old-fashioned way of administering justice and thinks that the present tendency is all wrong (to give courts and penal institutions more power to adjust the penalty to the individual delinquent and to differentiate sharply in his treatment), he should visit our local county and municipal institutions for short-term prisoners. There he will find for the most part undifferentiated treatment and all the old-fashioned ideas with respect to diet, dirt, disease, predestination and eternal damnation that so delighted his forbears."

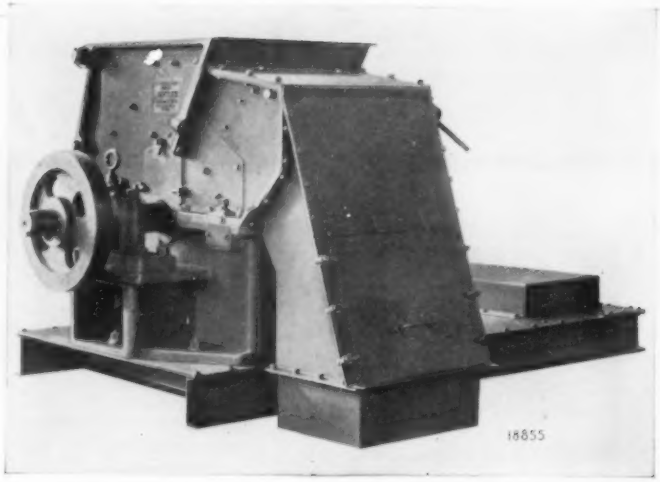
These strong words are from the report entitled "Propagating Crime Through the Jail and Other Institutions for Short-Term Offenders," submitted to the National Crime Commission* by the Sub-Committee on Pardons, Parole, Probation, Penal Laws and Institutional Correction; Frank O. Lowden, Chairman, and Louis N. Robinson, Secretary. To quote further:

"The fundamental cause of the existing evils in jails, workhouses, houses of correction, road camps, etc., is the fact that they are so completely under the control of local (county or municipal) government. . . . Local control of penal institutions in the United States has been almost a complete failure. . . . In the vast majority of instances the county or the municipality is too small a unit to have an institution. An institution of about 500 is the accepted European standard for size. While in our larger cities penal institutions of this size would be needed, this would not be the case in the majority of cities and counties. Indeed, the average population of these local penal institutions is less than 11. Now we must have an institution large enough to justify hiring a first-class warden or superintendent at a good salary. . . . Size is also essential to justify expenditure for tools, machines, workshops, and for personnel. In other words, a modern prison is not simply a series of cages in which criminals are to be kept for a certain length of time under lock and key without purpose and without function. . . . It is and must be an institution for the re-education of individuals, and as such it must possess a proper plant and a proper personnel equipped to do the work. Our local units of government do not each need such an institution. From two to six would probably be sufficient for any one of the individual states.

"Not only is this question of size a sufficient argument for doing away with local control, but there is a second reason. . . . Centralized state control is essential for the full utilization of institutions that would care for the great group of offenders now confined in these local institutions. . . . Only under full state control can prisoners be freely shifted to that particular institution best suited to their needs. . . . In a given state there is after all only so much knowledge of penological problems. . . . The state is in a position to make the ideas and the ideals of the few individuals competent in these matters serve the entire community."

* 32 pp. Apply to the Commission, 120 Broadway, New York.

A PRIZE-WINNING POSTER BY A. LANDSMAN, SENIOR HIGH SCHOOL, ST. LOUIS, MO.



ANNOUNCING A NEW Green Garbage Grinder

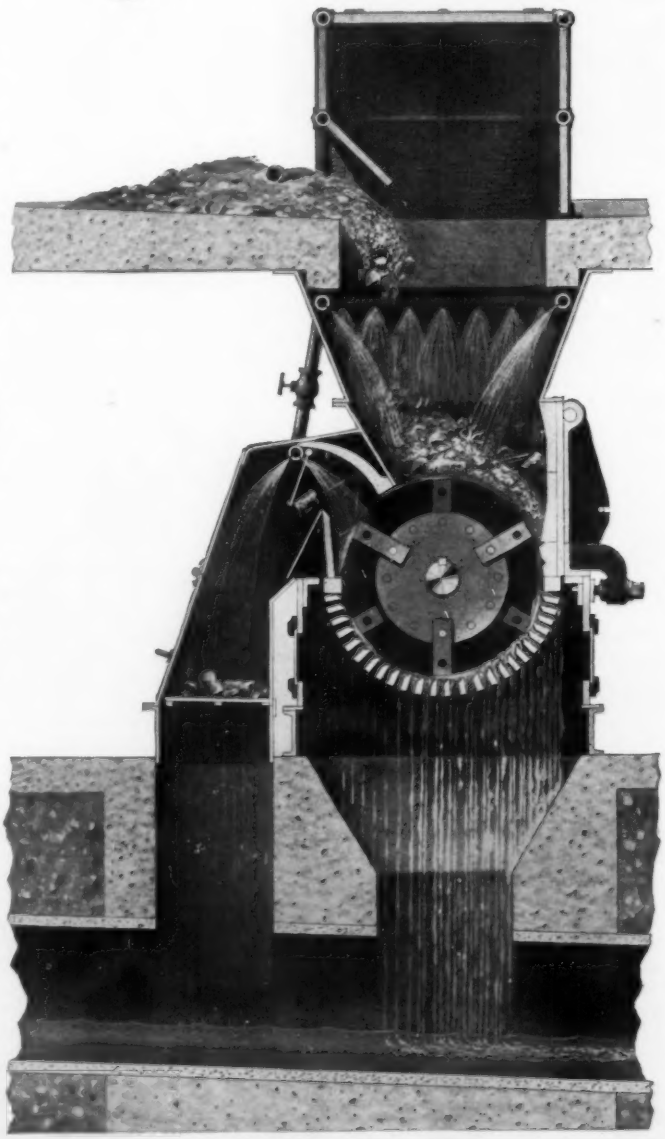
In those cities where hog feeding, incineration or dumping at sea have been proved unsatisfactory or impractical, the specifications frequently require that "final disposal of garbage shall be by the reduction process."

This NEW Jeffrey Grinder was designed especially for the reduction of green garbage. It is rapidly being proved the least troublesome and most economical means of garbage disposal.

This Grinder reduces the garbage to a pulp so finely divided that it will settle in water and, discharged into the sewerage system, can be handled as sludge at the disposal plant.

The upper illustration shows the Jeffrey Green Garbage Grinder mounted on a steel base, which is optional. The cross-section view shows the construction and operating features of this new grinder.

Write for complete information.



The Jeffrey Manufacturing Company
970-99 North Fourth Street, Columbus, Ohio

New York	Boston	Milwaukee	St. Louis
Buffalo	Scranton	Detroit	Dallas
Rochester	Pittsburgh	Cleveland	Salt Lake City
Philadelphia	Cincinnati	Denver	Birmingham
	Chicago	Huntington	

Jeffrey Manufacturing Company, Ltd. of Canada
Head Office and Works: Montreal
Branch Offices: Toronto—Calgary—Vancouver

JEFFREY
Material Handling Equipment

THE AMERICAN CITY should always be mentioned when writing for this material which is furnished free.

DON'T GET BEHIND *The* TIMES

READ CATALOGS

Keep your files up to date by checking over these items each month and writing for those you need.

GUARANTEED WATER SUPPLIES

446. Layne & Bowler, Inc., Dept. B, Memphis, Tenn., which has been known for fifty years by municipalities, industries and railroads for the integrity of guarantee of "Water or No Pay," will be pleased to send you free bulletins on Layne pumps, wells and well-water systems, which are of special value to municipal officials.

PUBLIC ADDRESS AND PROGRAM DISTRIBUTION SYSTEMS

447. When you install a Western Electric public address system, one band can be heard everywhere in the park and in other parks. This equipment picks up speech and music, amplifies it to any degree desired and distributes it through loudspeakers to any number of selected points, or if used in a city hall or auditorium or municipal stadium or airport, it enables every one to hear clearly. An illustrated booklet on the Western Electric public address and program distribution system may be secured from Graybar Electric Co., Graybar Bldg., New York.

GREATER EFFICIENCY IN STREET LIGHTING

448. Those interested in advance information about an announcement of importance to all interested in street lighting, pointing the way to worth-while economies and greater efficiency, should send name and address to the General Illumination Engineering Co., Carew Tower, Cincinnati, Ohio.

CLAMPS FOR REPAIRING PIPES UNDER PRESSURE

449. Emergency pipe clamps which are equally effective on steam, water, air, gas, oil, ammonia, brine and chemical lines, and which make an instant and permanent repair for pipe leaks and are safe and sure under any pressure or temperature, are described in literature which may be secured from M. B. Skinner Co., South Bend, Ind.

SINGLE AND DUAL DRIVE MOTOR PATROL GRADERS

450. The Austin-Western Road Machinery Co., 400 N. Michigan Ave., Chicago, Ill., has issued two new bulletins on the Austin Model-20 motor grader with single drive and with full dual drive. These are listed as Bulletins 1292 and 1293 respectively.

A SUMMER STREET SHOWER FROM THE NEAREST HYDRANT

451. The Bradley street shower, which gives a shower of cool, clear water from any hydrant, throwing a soft, gentle spray in a radius of 20 feet, and which can be attached to a hydrant or detached in 20 seconds, is described and illustrated in the literature of the Bradley Washfountain Co., 2205 W. Mich. St., Milwaukee, Wis.

A TRACTOR DERRICK FOR HANDLING MATERIALS

452. A new tractor derrick for use in piling, loading, unloading, moving and handling equipment and supplies, for laying pipe of all kinds, ripping up abandoned street-car tracks, setting or removing poles, erecting small and medium bridge members, or other structural steel, placing or moving elevated transformers, and in general performing all the functions of a light locomotive crane, has been announced by R. G. LeTourneau, Inc., Wilson Way at Roosevelt St., Stockton, Calif. Complete information regarding this new mobile machine may be secured direct from the manufacturer.

SEWAGE DISPOSAL EQUIPMENT

453. Those interested in the latest developments in mechanical equipment for sewage disposal plants should send for the leaflet of Municipal Sanitary Corp., Room 2701, 155 E. 44th St., New York.

TRAFFIC GATES TO PROTECT SCHOOL CHILDREN

454. Catalog No. 47 issued by The Barkelew Electric Mfg. Co., Middletown, Ohio, completely describes and illustrates the use of Barkelew school traffic gates for use at crossings when school children must cross heavy-traffic streets.

INDUSTRIAL TRACTORS IN MUNICIPALITIES AND TOWNSHIPS

455. J. I. Case Co., Inc., Racine, Wis., in Form 1133 describes the use of the Case industrial tractor for making department budgets go farther, and shows how these tractors furnish handy power for road and street maintenance, cable pulling, garbage collection and disposal, water pumping, park and golf course maintenance, street sweeping, mowing, sprinkling, snow removal, general hauling and, in fact, for every municipal and township use.

ASPHALT TOOLS FOR STREET WORK

456. Hetherington & Berner Inc., 701-713 Kentucky Ave., Indianapolis, Ind., will be pleased to send complete information and an illustrated folder describing its street tools, which are made by a foundry process that assures exceptionally smooth asphalt wearing surfaces. The pipe handles are welded to the heavy steel stubs, making them inseperable.

LAWN MOWER CUTTING BLADES

457. The Brunite cutting blade, which modernizes any lawn mower, is described in an illustrated folder which may be secured from the Miller Power Lawn Mower Co., 6662 Pearl Road, Cleveland, Ohio.

BULLETINS ON ACTIVATED CARBON

458. Reprints of two papers, "Experiences with Activated Carbon," by George R. Spalding, Assistant Superintendent, Filtration and Sanitation, Hackensack Water Co., New Milford, N. J., and "The Activated Carbon Method of Water Treatment," by F. E. Stuart, Research Engineer, Water Purification Division, Industrial Chemical Sales Co., Inc., New York, which cover the use of this material in water purification, may be secured without cost from the Industrial Chemical Sales Co., Inc., 230 Park Ave., New York.

PUSH BROOMS AND STREET SWEEPER MACHINE BROOMS

459. The Joseph Lay Co., Portland, Ind., has issued an illustrated folder on Lay push brooms for hand cleaning of city streets and on refills for all makes of street sweeper machine brooms.

A NEW CENTRIFUGAL PUMP

460. Goulds Flexi-Unit centrifugal pumps, in capacities up to 4,500 gpm under heads up to 350 feet, which are a new development in pump design, are described in Bulletin No. 203, which Goulds Pumps, Inc., Seneca Falls, N. Y., will be glad to send upon request.

A PORTABLE DIESEL POWER UNIT

461. Bulletin No. 128 describing the new Superior portable diesel power unit, which is a complete self-contained power plant, including radiator cooling system, auxiliary gasoline-engine-driven air compressor and air receiver for starting, fuel oil tank, lubricating oil tank, clutch and pulley, etc., may be secured by those interested from the Superior Engine Co., Springfield, Ohio.

FOUR-CYCLE DIESELS FOR MUNICIPAL POWER

462. Bulletin 51 recently released by Nordberg Mfg. Co., Milwaukee, Wis., describes the new Nordberg four-cycle engine. It has mechanical injection, complete pressure lubrication, and totally enclosed parts, yet all parts are accessible and of rigid construction, and the engine is completely equipped.

"BRINGING CITIES OUT OF THE TWILIGHT ZONE"

463. Westinghouse Electric & Mfg. Co., Room 2-N, East Pittsburgh, Pa., will be pleased to send a copy of its booklet, "Bringing Cities Out of the Twilight Zone," to any municipal officials faced with demands by taxpayers for reductions in street lighting. Owing to the stress of the times, many taxpayers, not realizing the true economy of street lighting, are making unsound suggestions.

THE MAINTENANCE OF HEAVILY TRAVELED ASPHALT ROADS

464. Economy in the annual cost of asphalt road maintenance per mile over a period of years is the test of a road material. Complete figures on a road which carries an average traffic of 2,500 vehicles per day and a maximum traffic of 4,000 vehicles per day, and which showed a total cost of only $261.08 per mile over a period of eleven years, is given in a folder which may be secured from Koppers Products Co., Koppers Bldg., Pittsburgh, Pa.

A LEAFLET ON AN OUTSTANDING PUMPING STATION

465. The new water filtration plant and pumping station at Highland Park, Ill., is described in a leaflet which has been prepared by the De Laval Steam Turbine Co., Trenton, N. J., and which will be sent free to any readers interested.

DROPPING DEWDROPS TO END DUSTY ROADS

466. The Dow Chemical Co., Midland, Mich., has issued a new illustrated bulletin telling how Dowflake calcium chloride helps the dewdrops to chase dust off gravel and dirt roads. A copy may be secured without cost on application.

Reprinted from WESTERN CITY, *May, 1933.*

Modern Service Pipe Installations In Pacific Coast Cities

Experience of California Water Service Company Is That Copper Tubing Gives Best Results; Now 5935 Such Services in 28 Cities

. . .

By H. A. Harris

Operating Engineer, California Water Service Company

AMONG the first services of record is the well in Jerusalem where the women came with their earthen jugs and filled them, and climbed the stairs balancing the jugs upon their heads. This service is still in use today, the only difference being that five-gallon oil cans have replaced the earthen jugs. We also had the old town pump in early American communities where all of the inhabitants came to get their water supply. A very unique water service was in vogue in several western mining towns. This consisted of a string of ten burros each carrying two water bags. Each consumer had a water barrel which the owner of the system agreed to keep filled for $1 per month. I assume that this formed a basis for our present minimum monthly charge. The owner's investment per service was quite low compared to our investment in Stockton of about $150 per consumer.

Many Materials Used

It was therefore quite a step forward to the time when individual services were carried into each home.

Many materials have been used in services in the past several centuries. Among these were wood pipe made from bored logs, lead pipe and wrought iron pipe.

These materials had a great many objections and so we find that when wrought steel pipe was developed it was quite universally adopted due to the fact that it was relatively cheap and overcame the difficulty experienced with lead pipe, namely, lead poisoning.

In order to make steel more resistant to corrosion, the galvanizing process was developed and served very well.

I believe that it is safe to say that by far the majority of the services now in the ground are of galvanized steel.

When our company first took over its properties in 1926, we made a study of our services and found that all the services, except a very few, were of galvanized or black steel pipe. In our Petaluma plant, we had a few hundred services of genuine wrought iron pipe.

We began at once to gather some data relative to life of our services. We found that in some localities there were services thirty years old that were in very good condition and that in other localities we were replacing these services within eighteen to thirty-six months after their installation. We also found that in some localities where the pipe suffered very little from external corrosion it was badly tuberculated on the inside and often so filled with growth on the inside that its carrying capacity was reduced twenty-five to fifty per cent.

Newer Materials Used

Prior to this time steel service pipe with inner lining was on the market. To my knowledge, at least two linings were used, cement and lead. Also seamless copper tubing was being used somewhat.

Due to the above troubles that we were experiencing with steel service pipe and a growing interest in lined pipe and copper tubing, it was decided to try the newer materials. At the beginning of 1928 we decided to make all our service installations of ¾" and 1" size with either lead lined galvanized steel pipe or seamless copper tubing in approximately equal quantities. At the same time it was decided to make all services over 1" in size with cast iron pipe. Pipe with precalked lead joints to be used in the 1¼" and 2" sizes.

Covers Entire Pacific Coast

As our territory of operations covers practically the entire Pacific Coast from Mt. Vernon, Washington, seventy miles north of Seattle, to Redondo Beach, twenty miles south of Los Angeles, we had an excellent opportunity to make a thorough trial of these materials under all kinds of soil and water conditions. We have well supplies with comparatively hard water and gravity supplies with very soft waters. Our collective purchasing power also made it possible to purchase in carload lots, thereby getting the best market price in making our trial installations.

In order to assure absolutely uniform installation throughout the system, our Engineering Department prepared a set of drawings showing the standard method to be followed for each material.

Copper Handled Differently

When these materials were first sent out to our plants, we found a tendency for many of our service men to favor the lead lined steel pipe over the copper tubing. Upon investigation, I found this was because it cut, coupled and handled exactly the same as the steel pipe, which they had been using, whereas the copper tubing had to be handled quite differently. We insisted upon the use of equal quantities of both materials, and found that after installation of large quantities of both materials, that most of the men preferred to handle the copper. This was largely due to the fact that it came in coils, did not have to be threaded and that few fittings were required.

Copper Approved

Another objection which came up in the beginning was the construction foremen's belief that the copper tubing could not be installed by pushing or hydraulic methods. On first thought this seems reasonable enough, but I will explain in detail later several methods of accomplishing this.

After two years trial of lead lined steel pipe and copper tubing, we decided that for our use the latter was the most satisfactory. The copper tubing is easier to handle, the labor cost is less, very few fittings are required, and it is equally resistant to corrosion from the inside and the outside. One very serious objection we had to the lead lined pipe was that much of this pipe was not lined with a uniform thickness of material.

In order to show how extensively we have used copper tubing services, I have prepared a table which shows

Presented before California section, A.W.W.A.

JULY, 1933

Vol. XLVIII, No. 7

The American City

470 Fourth Avenue
New York

35 Cents, $2 a Year

Federal Loans and Grants Now Available for Local Public Works and Municipal Improvements

UNDER the terms of Title II of the National Industrial Recovery Act, approved June 16, 1933, Federal aid is offered to states, counties and municipalities, on much more liberal terms than ever before, in the financing of a wide variety of public works, municipal improvements, and housing* and slum-clearance projects.

As indicating the desire of Congress to secure speedy action and to cut "red tape" wherever possible, Section 203 (d) of the Act provides that out of the $3,300,000,000 appropriated in Title II:

"The President, in his discretion, and under such terms as he may prescribe, may extend any of the benefits of this title to any state, county or municipality, notwithstanding any constitutional or legal restriction or limitation on the right or power of such state, county, or municipality to borrow money or incur indebtedness."

Just how local public authorities, even under this authorization by Congress, can make valid agreements to repay Federal loans in excess of statutory or charter restrictions is not clear; but one suggestion which has been made that may prove practicable in the case of a city now up to its debt limit, is for the Government to finance the cost of needed local public works or facilities and lease such improvements to the city until the latter is able to give a binding agreement to substitute a Federal loan for such lease.

Aside from the paragraph above quoted, the features of the Act of special importance to local public bodies conform in the main to the bill as originally adopted by the House of Representatives and quoted on page 5 of THE AMERICAN CITY last month. Local officials desirous of filing applications under the Act are strongly urged, however, to secure the full text from the Federal Emergency Administration of Public Works, Interior Department Building, Washington, and to study the application form for loans, reproduced on the next page. Certain features of the Act merit special emphasis.

The Federal Government now has the power, not only to make loans to any municipality for the full cost of public works or of any "publicly owned instrumentalities or facilities," but to make outright "grants" (gifts) up to 30 per cent of the cost of labor and materials used in the "construction, repair or improvement of any such project." There are also liberal provisions for gifts to states for the building of through highways in municipalities and for the elimination of traffic hazards within city limits.*

The "self-liquidating" restrictions which were so serious a handicap to the securing of loans from the Reconstruction Finance Corporation under the Act of last year have been removed entirely, and, as indicated in the foregoing paragraph, the new law not only is broad enough to cover loans and partial grants for public works as that term is generally understood, but apparently authorizes such loans and grants to aid municipalities in securing additions to or improvements in needed facilities for protecting their communities against fire and lawlessness, and for street lighting, traffic control, street cleaning, garbage collection, playground equipment, etc.

State Administrators to Be Appointed

When President Roosevelt signed the National Industrial Recovery Act on June 16, he announced that:

"During the coming three weeks, Title II, relating to public works and construction projects, will be temporarily conducted by Colonel Donald H. Sawyer as Administrator and a special temporary board consisting of the Secretary of the Interior as Chairman, the Secretary of Commerce, the Secretary of Agriculture, the Secretary of War, the Attorney General, the Secretary of Labor and the Director of the Budget."

As soon as the President returns from his brief vacation, it is assumed that the forty-eight State Administrators of the new Act will be appointed. Meanwhile, according to *The United States News*, consideration is being given to numerous projects proposed to the Reconstruction Finance Corporation as self-liquidating projects but found not to come within the terms of the Act governing the Corporation, which have been surveyed and found to be desirable, but could not, under the law, be financed by the Corporation. These are expected to provide a starting point for rapid development of the whole program in the states.

*For an analysis of the housing features of the Act, see page 5 of this issue.

*Section 204 of the Act specifically authorizes grants aggregating not less than $400,000,000 to state highway departments for roads, streets, bridges, traffic facilitation, grade-crossing elimination, etc., in urban and rural areas. Amounts available for expenditure July 1 have already been allocated to the states, and rules and regulations, formulated by R. G. Tugwell, Acting Secretary of Agriculture, for carrying out the provisions of this section were approved June 23 by Secretary of the Interior Harold L. Ickes, as Chairman of the Special Board for Public Works. These rules are obtainable in mimeographed form from the Department of Agriculture.

How to Apply for Approval of Projects Under the National Industrial Recovery Act

AS SOON as state administrators are appointed by the Federal Emergency Administration of Public Works—which will probably be early in July—applications will be considered by them for public works projects to be financed under the terms of the National Industrial Recovery Act. Meanwhile readers of THE AMERICAN CITY may save valuable time by studying Form No. 1, here reproduced, issued June 28 by the Federal Emergency Administration of Public Works, as indicating the detailed information which will be required before applications are transmitted to Washington for final approval there.

According to a statement of construction policy, released from Washington on June 22, "all public works projects, whether national, state, or local, should meet the test of certain requisite conditions and should be ranged in a certain order of priority. These tests and priorities should be applied by the local and the central administration in passing upon all projects submitted.

"The requisites which a project should possess in order to entitle it to consideration are the following:

"1. The project should be socially desirable in the sense of contributing something of value to the equipment of the community and should not be a mere makeshift to supply work.

"2. No work should be constructed which would require for its maintenance or operation an additional outlay by the Federal Government.

"The priorities to which different classes of projects should be entitled are as follows:

"1. Projects which can be entered upon at once and completed with reasonable speed should be preferred to projects which would be spread over a relatively long period. This is in order to stimulate immediate revival of employment and industrial activity.

"2. Projects which are located in or near a center of unemployment should be preferred, so far as practicable, to those located in areas where the problem of unemployment is less acute.

"3. Projects which are integrated with other projects into a significant plan should be preferred to projects which are isolated and unrelated."

INSTRUCTIONS TO APPLICANT

NOTE 1. *To whom application should be presented.*

The application and the papers and plans accompanying it should be submitted to the State Administrator, Federal Emergency Administration of Public Works, whose office is situated in the State in which your project is located.

The application and all papers accompanying it will be submitted in quadruplicate.

NOTE 2. *Authority and identity of applicant.*

If the applicant is a corporation copies of the following papers, all properly authenticated, must be furnished:

The charter of articles of incorporation.
The minutes authorizing project.
Extracts from minutes showing names of existing officers of the corporation.

In cases of applications by State or political subdivisions: Where State and/or local laws vest in State or municipal officers, such as State Engineer, Board of Public Works, etc., the power to construct projects, proceedings of the boards, etc., and/or certified extracts from the laws must be furnished which will readily establish the legal authority of the applicant to undertake the project. Applicants will expedite matters if an approving legal opinion of local counsel accompanies the application.

NOTE 3. *Drawings.*

By general plan is meant a drawing showing general location, plan, profile, and character.

As few sheets will be used as necessary, to show clearly the general features only and the location of the project. Detailed plans are not desired at this time.

The scale will be shown graphically. The north and south line will be indicated by a meridian arrow.

NOTE 4. *Character of project.*

State in general terms the general character of the work proposed, for example: "Extension of water works", or "construction of incinerator", etc.

NOTE 5.

Approval by Federal, State, or Municipal authorities is required in certain types of projects; for example, before construction of a bridge over a navigable waterway is undertaken, approval by the Secretary of War and the Chief of Engineers is required.

NOTE 6. *Estimated cost.*

This must be based on the special conditions prescribed in the Act, particularly Section 208. The rate of interest during construction will be announced later.

THERE IS NO CHARGE FOR FILING THIS APPLICATION

FEDERAL EMERGENCY ADMINISTRATION OF PUBLIC WORKS (Form No. 1)

State .....

Project No. ..... (Give no. as listed list)

FEDERAL EMERGENCY ADMINISTRATION OF PUBLIC WORKS
INTERIOR DEPARTMENT BUILDING
WASHINGTON, D.C.

IF THE STATE ADMINISTRATOR HAS NOT BEEN APPOINTED, HOLD APPLICATION UNTIL APPOINTMENT IS MADE.

APPLICATION FOR LOAN
(See instructions on last page of this form)

ADMINISTRATOR, FEDERAL EMERGENCY ADMINISTRATION OF PUBLIC WORKS,

THROUGH STATE ADMINISTRATOR AT .....

..... (Address) (Note 1)

SIR:

1. Application is hereby made by .....

of ..... (Address), for the approval of the project herein described, and for allocation by the United States of the sum of ..... dollars ($.....) to provide for its construction, under the provisions of Sections 202 and/or 203, 206, 207, and 208; National Industrial Recovery Act, approved June 16, 1933.

2. Legal authority, and identity of the applicant. (See Note 2.)

3. Description of work proposed. (Attach a general plan, see Note 3.)

a. Character of project. (See Note 4.) .....

b. Has work been started? .....

c. Are construction plans ready now? .....

If not, when will they be ready? .....

d. State length of time required after approval before construction work can commence? .....

.....

e. How long will it take to complete construction? .....

f. Is the project part of a larger plan or program? .....

g. Is approval by Federal, State, or Municipal authorities required? (See Note 5.) .....

If so, what steps have been taken to secure approval? .....

4. a. Estimated total cost: $..... (See Note 6.)

(1) Construction work, exclusive of cost of land.

(a) Labor, $.....

(b) Material, $.....

(c) Engineering and overhead, $.....

(d) Interest during construction, $.....

(2) Cost of land, if any, required for project, $.....

b. Estimated expenditures by months after commencement of construction.....

.....

5. Financial status of applicant.

a. For States and Municipalities, or other Public Bodies:

(1) What is present total bonded indebtedness of applicant? .....

(2) Are there overlapping debts on this project?.....

(3) What is limit of bonded indebtedness of applicant authorized by law? ..... (Amount in dollars)

.....; percent of assessed valuation? .....

(4) What authority has applicant to issue bonds or other securities for this work? .....

.....

(5) Is the budget of the applicant balanced?..... If not, what steps are being taken to balance it? .....

Attach complete financial statement for latest fiscal year, and a statement showing receipts and expenditures for the four years preceding.

(6) What percentage of taxes is now delinquent, and how long outstanding? .....

.....

6. Brief statement covering—

a. Necessity or convenience of the project—has it been approved locally? .....

b. How approved? .....

c. What general classes of labor or construction personnel will it benefit? .....

How many man-hours required? .....

d. Brief general description of project and any additional pertinent information to be attached.

7. REMARKS: .....

.....

.....

.....

16—668 (Official title)

Replaceable Sectional Paving for Vehicular Tunnels

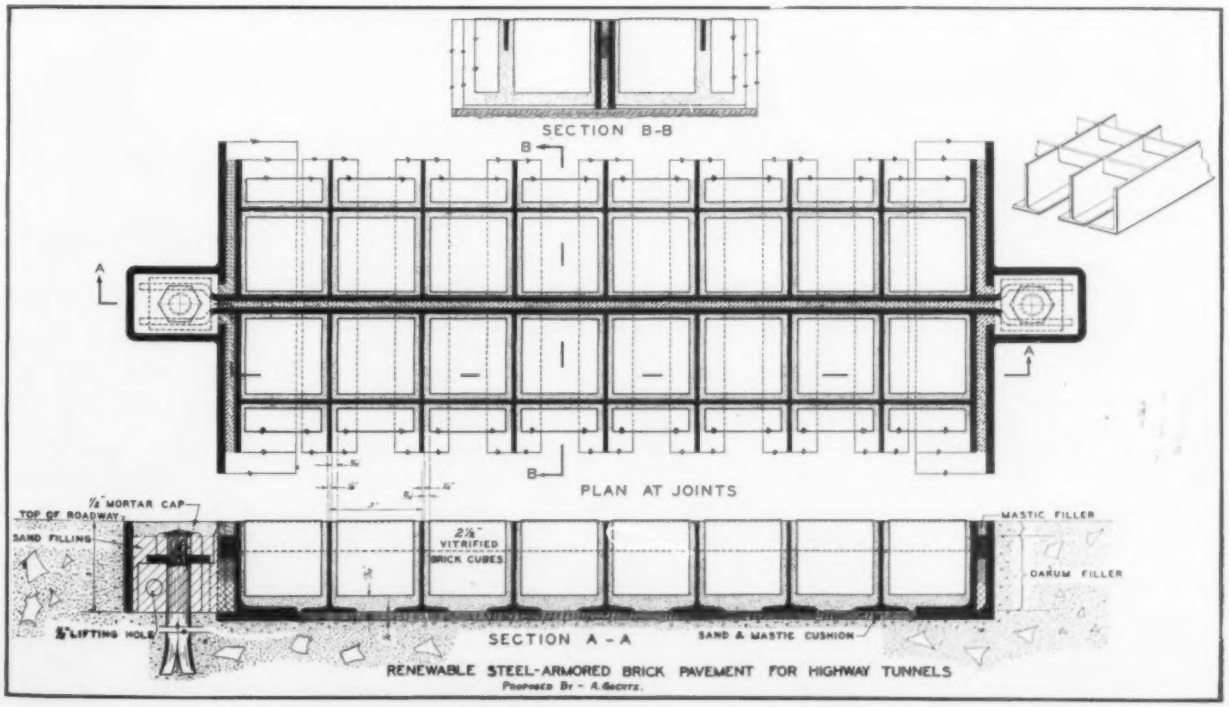
Designs and Experiments Conducted under Heavy Traffic Conditions in New York City

By **A. GOERTZ**
Designing Engineer, Board of Transportation, New York City

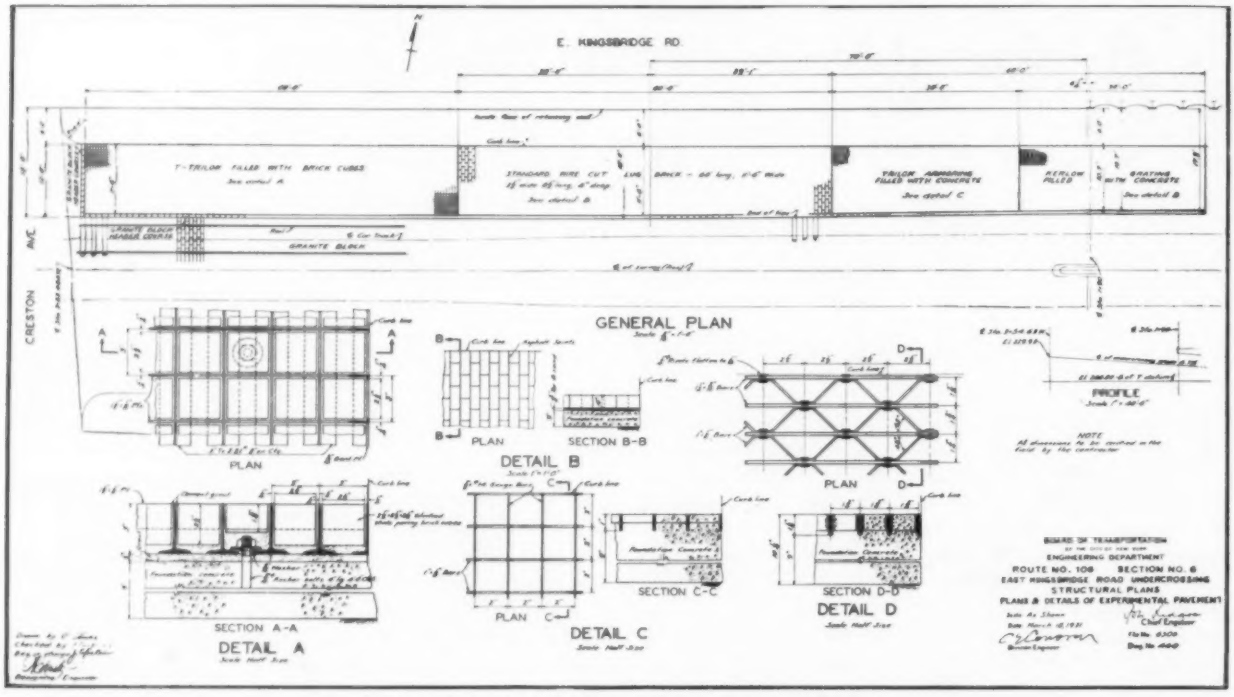
THE characteristics which determine the suitability of any form of pavement, such as wear resistance, initial cost, cost of maintenance, facility of renewal, riding smoothness, and non-skid qualities, are in general of the same relative importance in any type of roadway surface. In highway tunnels, however, two of these characteristics, namely, the wear resistance and the facility of maintenance and renewal, become of especial importance, because the high cost of the tunnels makes it imperative to keep their diameter, and consequently the width of the roadways, to an absolute minimum. Whenever it is necessary under these conditions to repair the pavement, traffic on one lane must be diverted to the adjacent lane. This temporarily reduces the capacity of the tunnels and is objectionable from the operating standpoint. The work itself cannot be carried on as freely as in the open, and the incidental delay adds to the cost. Furthermore, if granite block paving is used, the fumes from the hot binding material used in the joints are obnoxious to tunnel users, overtax the ventilation facilities and decrease visibility.

Another desirable feature in pavements to be used in tunnels of the type of the Holland Tunnel between New York City and Jersey City, N. J., is shallowness. Every inch of depth that can be gained from the thickness of the wearing surface represents a material saving in the cost of ventilation, because the air duct under the roadway can be made correspondingly larger.

The first step, therefore, in the design of the pavement for the prospective tunnels which must soon be built to connect the boroughs of Manhattan, Queens and Brooklyn, New York City, was to compare and review the wear resistance of different kinds of paving materials, such as steel, granite, brick, concrete and asphalt. All of these materials can be tested for crushing strength, roughness and the ability to withstand abrasion. While the results of such tests may serve for a rough comparison of the materials, they are not the only factors that establish their usefulness. In general, it is difficult to estimate even between wide limits the actual wear or loading per square foot to which a roadway surface is subjected. This knowledge, however, is of greater value for determining the



DETAILS OF ARMORED BRICK STRIPS FOR VEHICULAR TUNNEL ROADWAYS



PLANS AND DETAILS OF THE EXPERIMENTAL PAVEMENT

proper surfacing material than specific hardness or some other physical factors which are frequently of minor importance in estimating the economic aspects of a proposed roadway construction.

On heavily traveled roads traffic usually proceeds in more or less definite lanes during the busy hours of the day, but at other times it departs from these lanes, so that while the total number of vehicles for their weight passing over a certain section of road may be known, there are no means at hand for accurately determining which part of the roadway surfaces receives the hardest wear, nor what proportion of the total load comes upon it. Consequently, it is not possible to determine the actual wear which any particular part of the surface, either transversally or longitudinally, must withstand. On bridges, preferably those carrying street-car tracks, where the vehicular lanes at the sides of the tracks are quite closely defined, a much better idea can be gained of the relative wear coming on different portions of the bridge floor than on less restricted roadways.

In vehicular tunnels traffic is restricted to still narrower lines and is not permitted to pass from one lane to the other. Thus, all cars must follow the same line within very narrow limits, practically forcing all wheels to track along strips not more than 24 inches wide. This fact allows the load which these strips must carry to be approximated with much greater accuracy than where traffic is allowed to weave. For example, traffic through the Holland Tunnel has reached a total of 14,000,000 vehicles a year, or 7,000,000 through each of the two tunnels. Since there are two lanes in each tunnel, it is estimated from the traffic counts of the Holland Tunnel that in one year, roughly, 10,205,000 wheels pass over each of the strips in the fast lane, with a weight of about 6,125,000 tons, and 2,550,000 wheels pass over each of these strips in the slow lane, with a load of approximately 6,630,000 tons. This means that over every square foot of the wearing strips more than 8,700 tons are carried daily. There is probably no other roadway in the world which is called upon to withstand an equal intensity of loading. It may easily be seen from this how much more reliable are these figures for obtaining an idea of the work which the surfacing material must do than a mere statement that a road carries so many thousands of vehicles or so many tons in a year.

Studies of Paving Materials

In the studies of paving materials, concrete was ruled out, since by comparative rattler tests it was shown that samples are abraded much faster than granite or vitrified brick. The most serious objection to concrete, however, was deemed to be the delay which repairs would entail. With the most favorable conditions, a lane under repair would be closed to traffic for several days to allow the concrete to harden sufficiently to permit traffic over it. Granite was not deemed suitable for paving the wheel tracks, because of its high cost, because of the wide joints necessitated by the rough surfaces, and because an asphalt or tar filler must be used at the joints and it is therefore difficult to form a smooth flush surface with the adjacent surface. Owing to its rougher character, it would tempt drivers to edge onto the smoother concrete and increase the danger of sideswiping. Cast iron or steel checkered plates offer long life, but they become polished and slippery and are conducive to accidents. Unless firmly embedded in concrete, they will work loose and rattle, especially when non-skid chains are used, making the tunnels very noisy. Their replacement would be as difficult as the replacement of concrete. Serious consideration cannot be given to asphalt in any form. Its plastic nature, dark color and slipperiness practically preclude its use in the tunnels.

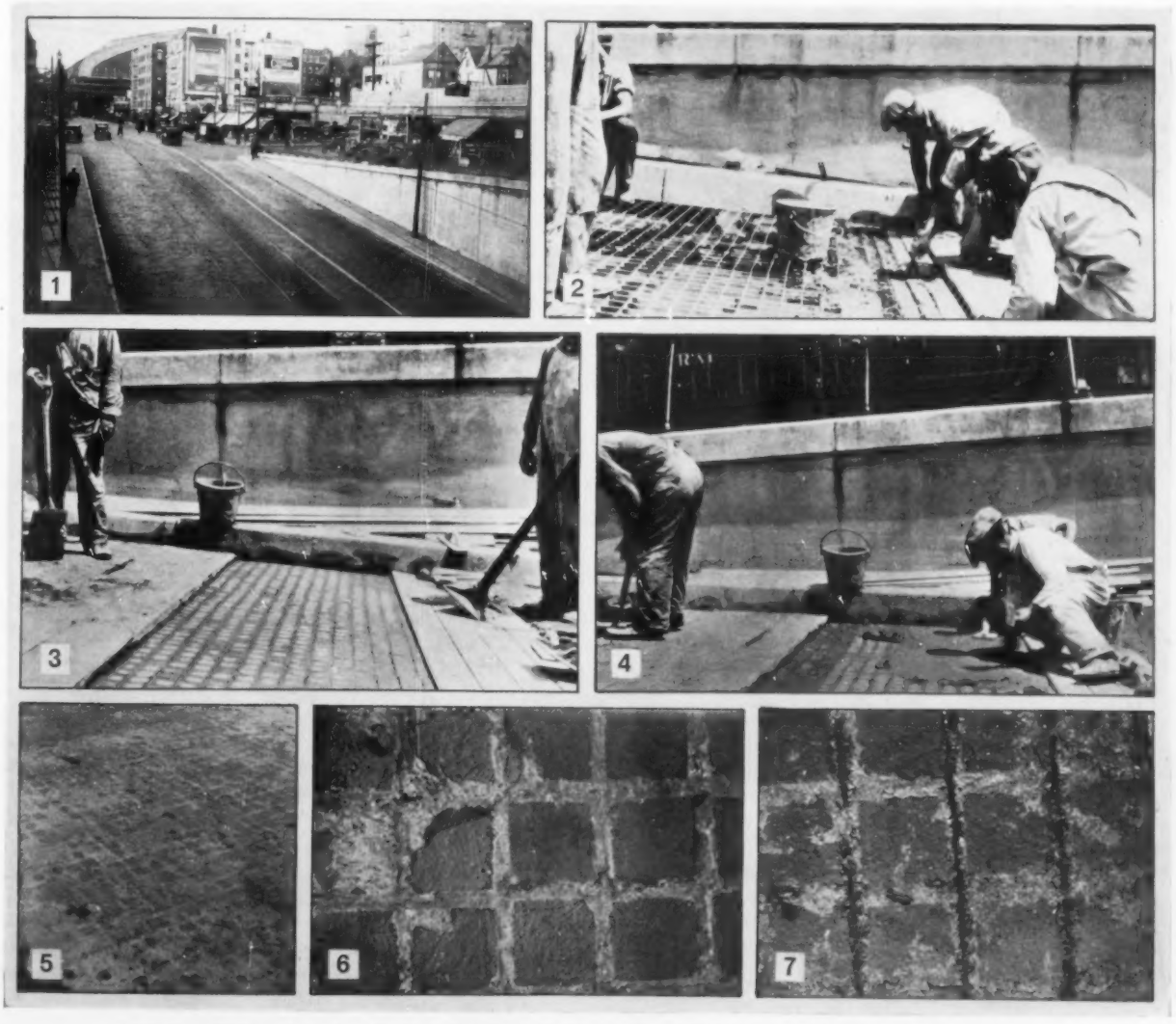
Paving brick is a suitable material, for it rivals granite in strength and is more resistant to wear than concrete.

It also meets all reasonable requirements as regards slipperiness, retaining its non-slippery surface without polishing. Ordinary paving brick laid in the standard manner would probably form as smooth a surface as it is possible to get, not excepting sheet asphalt, but in the tunnels, a uniformly colored surface did not seem entirely satisfactory, because of the desirability of having some form of guide to car clearances. If asphalt filler were used, the probability that the entire roadway surface would be black appeared objectionable, and brick would be no better in this respect than the granite block pavement.

Experiments with Brick and Steel Construction

A grating originally designed to be used filled with concrete to give a self-sustaining armored concrete bridge floor known as Tri-Lok construction had been developed by the Carnegie Steel Co., Pittsburgh, Pa. This type of construction has been used in a number of cases and appears to give satisfactory service when installed, but in no case has this form of construction been subjected to the same intensity of loading as would occur in highway tunnels. The concrete filling did not seem to be the best type of filler for tunnel construction. After considerable study of small-mesh and large-mesh grating of this type, it was decided to use steel grating for that element of the paving strip, which would permit ready removal and replacement, and to furnish additional wear resistance if necessary, supplemented by brick cubes placed in the mesh of the grating as the element affording traction, taking wear and resisting slipperiness.

The wearing strips as designed consist of 3-inch square mesh grating, 3 inches deep, built in sections 10 feet long. Brick blocks $2\frac{1}{2}$ x $2\frac{1}{2}$ x $1\frac{7}{8}$ inches are set with cement mortar into the pockets of the grating with the upper wire-cut surface of the cubes flush with, or slightly above, the adjacent steel. The 3/16-inch joints between the bricks and the steel are filled with cement mortar. The steel sections will be 24 or 30 inches wide and their outer



THE EXPERIMENTAL SECTION OF STEEL-ARMORED BRICK PAVEMENT AT EAST KINGSBRIDGE ROAD, NEW YORK

1. The completed section. The armored brick roadway appears as a bright patch next the right hand curb. 2. Inserting the mortar and brick cubes into the pockets of the grating. 3. The brick surface after tamping the blocks into place. 4. The final filling of the joints and dressing of the surface. 5. The roadway completed. 6. Condition of the joints in the galvanized grating section after 15 months' service. 7. Condition of the joints in the plain grating after 17 months' service

edges will be formed by steel angles instead of tees. The end bars of the sections will project about 3 inches beyond the sides and flare out.

The main roadway surface of the tunnels as proposed would consist of concrete in which shallow troughs or channels centered on the wheel tracks will be constructed. The edges of these channels or troughs will be formed by continuous lines of steel angles, the upstanding legs of which will be cut out for a space of about 2 inches every 10 feet where the grating sections will join. Small boxes formed of steel 4 x 4 inches in area, and of the depth of the trough, will be welded to the angles to span the openings and provide a recess into which the projecting ends of the grating sections will fit. Anchor bolts ⅞-inch in diameter will be set in the center of the boxes. The grating sections will then be set into the troughs, after the bottom of the troughs has been covered with a shallow cushion of sand mixed with a bituminous material graded flush with the top of the horizontal legs of the trough angles. When the next section is placed, a small plate, large enough to cover the ends of the bars curving around the anchor bolt, will be slipped over the bolt, and the nut then screwed down. This will hold the section permanently in place and will prevent rocking. The pockets are then filled with sand and covered with a thin layer of mortar flush with the tops of the adjacent concrete and trough angles.

The purpose of the mastic cushion is to prevent the accumulation of water. It is not required for support because the grating is amply strong to transfer the heaviest wheel loads directly to the side angles with no supports between. The grating is so strong that the deflection is not measurable with ordinary instruments. The ¼-inch space between the brick and grating sections and the trough angles is to be filled loosely with sand or oakum very nearly to the top, then filled with an asphalt emulsion to prevent the entry of water. The joints between successive sections are to be treated similarly. The sections can be completely fabricated on land and delivered on the work as required.

Replacement

When it is necessary to replace a section which has become worn out or damaged, a new section can be taken out of storage and transported to the site. The mortar over the pockets is then knocked out and the nuts removed. By means of holes punched in the projecting ends of the end bars, the entire section can then be lifted out with hooks. Occasionally, small jacks or levers may be necessary if the side joints have been packed too tightly. The new section is then dropped into place, bolted down and recalked, the pocket refilled with sand and covered with mortar, and the section is ready for use. The calking, if necessary, can be deferred to a time when traffic is light. The entire work of replacing a single section should not take more than one hour, and if a number of sections are to be taken up and replaced, the work should not take more than 20 or 30 minutes per section.

Experimental Section

To determine the merits of this type of pavement in comparison with plain brick pavement and with the ordinary type of armored concrete, an experimental installation was made in the roadway of the undercrossing of Kingsbridge Road in New York City at the Grand Concourse, built by the Board of Transportation in connection with subway construction. Kingsbridge Road is one of the main traffic arteries connecting the easterly and westerly portions of Bronx Borough and carries a fairly heavy traffic. The result of the test installation so far shows the merits of armored brick pavement for use in wearing strips to resist extraordinarily heavy traffic, and also shows that standard brick pavement is the equal of other forms of pavements for highway streets and avenues, and in many respects is superior.

By constructing concrete roadways with armored brick wearing strips instead of a granite block surfacing, it was estimated, a saving of several hundred thousand dollars could be effected in the length of the proposed tunnel roadways.

ACKNOWLEDGMENT.—From a paper presented before the Annual Convention of the National Paving Brick Association.

Extraordinary Development of Express Highways in the New York Region

A REPORT of a survey of public works construction throughout the New York Region, which was made at the fourth annual meeting and dinner of the Regional Plan Association on June 8, shows, among other things, an extraordinary development during the last four years of modern express highways. Of this type of highway for general traffic, both trucks and passenger vehicles, 103 miles have been either constructed since 1928 or had final plans adopted, in contrast with only 3½ miles previously existing. Preliminary studies have been made for an additional 76 miles.

On the subject of express highways, the report says in part:

"Express highways, supplementing the modern parkways restricted to passenger vehicles, are one of the significant developments in new principles of highway planning. They include those routes whose chief characteristic is the elimination of all, or at least the most important, road intersections at grade. Still a novelty in 1928, they have passed the experimental stage and become an important part in the official highway program of the states, counties and municipalities in the metropolitan area.*

"The proposed regional highway system, as presented four years ago, included 253 miles of express highways. The progress since then amounts to almost three-fourths of this mileage and includes, in New Jersey, some important routes in addition to those contemplated in the Plan."

The Regional Plan Association issues a warning that unless adequate protection is afforded express routes against intensive roadside development of unsuitable character, they will suffer greatly in both appearance and efficiency. A leading traffic expert has estimated that a lack of such protection may result ultimately in decreasing the efficiency of the highway from one-half to two-thirds of its capacity.

If it is found possible to supply roadways open to commercial traffic that are as satisfactory from the point of view of both the traffic and the public as the parkway is for passenger traffic, the situation will be greatly relieved. The provision of an extra roadway for commercial traffic, as projected in the Pelham - Port Chester Parkway in Westchester County, will be watched with interest as one of the most significant attempts yet made to solve this problem.

* The extent and wide distribution of express highway progress is shown in the map on the front cover of this issue of THE AMERICAN CITY, which also indicates the remaining routes in the proposed regional system.

Pumps and Their Places—Part II

An Outline of the Pros and Cons of Different Kinds of Pumps in the Water Works of the Average-Sized Community

By L. R. DOUGLASS
Construction Engineer, Denver, Colo.

Air-Lift Pumps

The third general class of pumps is the air-lift, the use of which is commonly confined to well pumping. The pump is composed of two elements: (1) the part that goes into the well; and (2) the air compressor and equipment which is on the surface. The pump proper and its apparatus consist of two pipes and a footpiece. One pipe is the discharge pipe, called the eduction pipe, and the other is an air line which takes the air down to the footpiece, which is on the eduction pipe. The function of the footpiece is to create a physical mixture of the air and the water. Contrary to the common idea, the air pressure does not blow the water up the eduction pipe; instead, the mixture of air and water causes a unit volume of water and air to be lighter in weight than water alone. Since it is lighter in weight, it rises in the eduction pipe because it is overbalanced by the greater weight of the water outside.

Since the success of the operation depends on the mixture of water and air, it is necessary for the footpiece to effect a proper mixture. It also follows that the eduction pipe must be of a definite diameter for the amount of water to be pumped, so that the mixture of air and water will be stable. Otherwise, the air will slip by the water and no discharge of water will take place. If the diameter of the eduction pipe is too large, this separation of air and water will take place. If it is too small, there will be too much friction between the ascending column of water and the pipe.

At the top of the well, the water strikes a separator which serves to remove the air from the water. The air lift must have an open discharge at the top for efficient operation. There may be an elbow at the top of the eduction pipe connected to a horizontal pipe leading the water over to one side, but any arrangement that would operate to offer resistance or create a back pressure on the ascending column must be avoided.

There are three methods of installing the air and eduction line. The common one, known as the standard, is for the air line to be on the outside of the eduction line and run down the well parallel to it. The central system carries the air line down inside the eduction line, and the water rises between the two. The third system consists of having the eduction line on the inside of the air line, the air going down the annular space between the outside of the eduction pipe and the larger air line. The decision as to which system to use depends on the cross-sectional area of the well and the amount of water to be pumped.

For an air lift to work, there must be a certain amount of submergence. That is, the footpiece must be submerged below the water level or pumping level in the well by a sufficient amount to overbalance the less dense column of air and water. This amount of submergence varies from as much as 65 per cent for a lift of 50 feet to 35 and 40 per cent for lifts up to 400 and 500 feet.

The chief advantage of an air lift is that there is no moving part or machinery in the well and consequently nothing upon which sand or suspended matter may cause undue wear. The air compressor is located in the engine room on the surface, where it can receive proper attention and service. It is in itself a reliable and dependable piece of equipment. The air lift can be operated successfully in holes of any practical size and in holes that are crooked and unsuited for any other type of pump. It can deliver more water from a well with sufficient capacity to deliver than any other type of pump which can be installed in a well. The efficiency depends upon the particular installation. Using a two-stage compressor, it is possible to obtain an over-all efficiency of from 35 to 38 per cent. This is a maintained efficiency and one which does not fall off with use.

The principal disadvantages of the air lift are the necessity for making the well deeper than is required for other types of pumps in order to secure adequate submergence of the air outlet, the intermittent nature of the flow from the well, and the relatively low efficiencies developed. There is no particular or limiting capacity, and air lifts are successfully delivering 500 to 600 gpm on lifts up to 400 or 500 feet.

Pump Foundations

In setting a pump, it should be placed on a concrete or masonry foundation, never on wood if the setting is to be permanent, as wood rots in time, causing settlement, with consequent leaky joints and probably troublesome air leaks. The pumps should be set as close to the source of supply as possible, and may receive water by a gravity flow where it is set below the level of the source of supply, or by suction where it is set above that source. In any case, the inlet or suction pipe should be sufficiently large to admit a full supply of water, and as short and direct as possible, and should have a minimum of valves and fittings. Where the inlet pipe is a suction pipe, the operation of drawing water to the pump is one of creating a vacuum in the suction pipe, which is then filled by atmospheric pressure. It therefore follows that before a pump will work properly under these conditions, it must be able to create such a vacuum or, as it is commonly termed, "prime" itself. It is necessary that the suction pipe be completely airtight and have no pockets where air might be entrapped. On high or long suction lines, a foot-valve should be used and when used it should have a net area in excess of that of the suction pipe. It is often

advisable or necessary to provide a priming pump of some character. While the reciprocating pump can normally prime itself by piston action, the centrifugal pump usually does not. It must, therefore, either be set below the water in order to prime itself, or always be provided with a foot-valve or a priming pump or both. The inlet should pitch up or rise from the pump, and the gate-valve on that line should be set with the stem horizontal so that the bonnet does not make an air trap.

Comparison of Different Types of Pumps

The discussion above covers the principal types of pumps under the three classifications which were previously listed. There are other types, such as hydraulic ram, jet pump, bucket or conveyor type, screw, etc. None, however, are used to any extent in water supply, and they are mentioned only as a matter of record.

It would seem proper now, after outlining the different classifications and types, to make a broad comparison of the relative advantages and disadvantages of each classification and type of pump:

STEAM POWER RECIPROCATING PUMPS

Advantages	*Disadvantages*
Low in first cost.	Is complicated and requires expert attendance.
Durable.	Is massive and heavy.
Flexible.	Requires large floor space and heavy foundations.
Will operate against a high head.	
High efficiency.	
Large capacities.	

STEAM- OR POWER-DRIVEN PISTON OR PLUNGER PUMPS

Durable.	High in first cost.
Capable of high suction lifts.	Massive and heavy.
Will operate against high heads.	Requires large floor space and heavy foundations.
	Not suitable for handling sandy water.
	Limited in capacities.
	Sudden stoppage may wreck the pump.
	Gives pulsating flow unless multi-cylindered.

ROTARY PUMP

Small and occupies small floor space.	High in first cost.
Flexible.	Not durable.
Easy to operate.	Has limited discharge.
No priming required.	Has limited capacity.
Gives non-pulsating flow.	Not suitable for handling water with suspended matter.
	Sudden stoppage may wreck pump.

CENTRIFUGAL PUMP

Low first cost.	Must be multi-staged for high pressures.
Durable.	Has narrow range of best efficiency.
Small and requires little floor space and small foundations.	Must be primed at starting unless set with positive suction head.
Simple to operate.	
Has non-pulsating flow.	
Suitable for direct connection to electric motor or steam turbine.	
Large capacity.	

CENTRIFUGAL DEEP-WELL TURBINE PUMP

Moderate first cost.	Comparatively low durability.
Small size—requires little space.	Not flexible.
Simple to operate.	Has limited discharge pressure.
Non-pulsating and large flow of water.	Submerged moving parts.
Requires no priming.	Fair mechanical efficiency.

DEEP-WELL AIR LIFTS

Handles any kind of water.	First cost plus compressor cost is high.
Will pump more water from well than any other type of pump.	Comparatively low efficiency.
No submerged moving parts.	Requires extra well depth.
Will operate on a crooked hole.	Has intermittent flow.
Several wells can be pumped at a time.	

Valves and Connections

All valves should be gate-valves and either non-rising or rising stems, as may be preferred or as conditions may dictate. It is necessary with centrifugal or rotary pumps, and desirable for all types, that a check valve be used on the discharge, so that in case of any accident or power outage, water will not flood back either to the source of supply or into the pump station through a broken pump. The discharge should also be provided with a gate-valve for shut-off purposes to permit repairs or other work on the pump.

Where two or more pumps are operating either in parallel or in series, connection should be made to the main discharge header with 45-degree elbows and Y-branches, and where elbows are used they should be of as long radius as possible. Tees should be avoided. The size of the discharge or delivery pipes should be such as to reduce friction losses to a practical minimum and be run in as direct a line as practicable and free from sharp bends. All displacement or reciprocating pumps should be provided with vacuum and air chambers on both the inlet and discharge pipes in order to take up the irregularities of flow due to intermittent or irregular action and to act as a cushion against injurious shocks. The size of the air chamber depends on the conditions; that is, for a high-speed pump operating against a high head, it would be larger than for a low-speed pump and a low head. Its function is to prevent shock.

Selecting Proper Pumping Machinery for Given Conditions

The basis for the selection of the pumping machinery itself should be suitability for the particular job at hand, reliability, durability and economy, with consideration of kinds of fuel or power available, building space necessary, foundations required, and type of pumping. The pumping station as a whole should bear rigid analysis as to its arrangement, reliability and promptness of service, first cost, operating cost, maintenance, and last, but not least, simplicity and avoidance of unnecessary complications in operating details. The location of the station is influenced by the source of supply, source of power, and the distribution system which it is to supply.

The number of pumping units contained in the plant is determined from consideration of the total load on the plant, the minimum and maximum demand, the variations that occur between these limits, fire protection and stand-by service. The least efficient set-up is where the pumps discharge directly into the mains, in which case the total capacity must be equal to the maximum demand, and adaptations to variations must be provided by series and parallel operation of two or more units. Even though several units may be selected and the several loads carefully adjusted to proportioned capacities, it is seldom possible to satisfactorily select a range of units that will efficiently meet all conditions. Furthermore, control is apt to become complicated and operation difficult. Also, under this system of pumping, attendance is required the full 24 hours of the day.

The most efficient condition is to pump into a storage reservoir or elevated steel tank of sufficient capacity to provide for daily and hourly demand variations and fire service. This arrangement permits the pumps to be op-

erated at their most efficient rate, and variations in seasonal and monthly demands can be taken care of by reserve units.

Between these two limits are many variations; each is its own problem and all are different in their details. The objects is, in any case, to divide the total load on the pumping plant among the various units so that each one may operate at its rated and consequent efficient capacity. It is also a fundamental requirement that the proper design of any pump station should provide for duplicate and standby service of such capacity as to always insure the maintenance of an adequate supply for any normal emergency. The ratio of capacity of this standby service to the total of the plant is a question of individual condition and design, and also the requirement of the underwriters. Where electric power is used that is transmitted from a distance, the standby service should be operated by another source of power, normally an internal-combustion engine, unless there is sufficient storage to carry over any possible length of power outage or breakdown.

The cost of pumping water is usually the largest operating expense of a water-works system. If a gravity supply can be secured within any reasonably comparative first cost, its installation will eliminate much future expense and not a few troubles. All operating mechanisms of whatever type require more or less constant attention, and however well designed are subject to wear, breakage and maintenance. Much of this can be avoided by intelligent and skillful operation, but no plant, large or small, will run itself without care and supervision. When a pumping plant is built, it must be regarded as a public institution of primary importance to the community. Its continuity of service must be dependable, and its layout and efficiency must be such as will properly safeguard both the public welfare and the public dollar. The final requirement is competent and capable operation.

ACKNOWLEDGMENT.—From a paper delivered before the Rocky Mountain Section, American Water Works Association.

A Consulting and Research Service for Cities, Counties and States

NINE national organizations in the field of government announce the incorporation, as a cooperative enterprise, of the Public Administration Service, as a consulting and research agency for cities, counties, states, and other governmental units. The Service will aid public officials to bring about constructive economy in government by revising and installing budget and other financial systems, by designing work programs, and improving organization and methods. This consulting service will be done on a non-profit basis, and at the invitation of public officers and in friendly collaboration with them.

At the same time, the Service will formulate and distribute standard practices and advanced methods of conducting governmental affairs, and will carry on joint research projects in administration for its constituent organizations, the results of which will be published through its Division of Publications.

The governing board of the Service, which will determine its policies, consists of the executive directors and secretaries of nine national agencies, all but one of which have their headquarters in Chicago: American Legislators' Association; American Municipal Association (the federation of state leagues of municipalities); American Public Welfare Association; Governmental Research Association; International City Managers' Association; Municipal Finance Officers' Association; United States Conference of Mayors; and National Municipal League (of New York). The office of the Service is at 850 East 58th Street, Chicago, Ill.

The Service is to be a continuation and expansion of the work heretofore carried on by the Research Committee of the International City Managers' Association. On behalf of the Committee on Uniform Street and Sanitation Records, representing the International Association of Public Works Officials and ten other national agencies, the same staff has already installed records and accounting systems and budgeting procedure for public works in over twenty cities, and has guided more than a hundred cities in adopting the Committee's standard practices. Testimony from these cities is unanimous that substantial savings and improvement in services have resulted. Donald C. Stone and Gustave A. Moe, who have directed this work, will be Director and Chief Accountant of the Consulting and Research Division of Public Administration Service. (See third item on page 69 of this issue.)

In its expanded form, the Service will be prepared to install budgets, general accounting systems, tax bills, cost accounting, special assessment records and procedure, public utility accounting and billing, public works records, police records, welfare records and cost accounting systems, hospital financial and cost systems, centralized purchasing, and personnel studies and systems. It will plan the re-organization of an entire governmental structure or of a single department or office. It will have at its disposal not only its staff experts, but the experienced members of the staffs of its constituent organizations; and when appropriate it will call in specialists of national reputation.

The Service will take over the publication of the monographs on problems of government and administration formerly issued under the name of Municipal Administration Service. Charles S. Ascher is the Director of Publications.

Recent City Manager Appointments

A. GORDON BAILEY succeeded Gordon M. MacPhail as City Manager of Woodstock, N. B., in May.

J. W. Bliss was appointed the first City Manager of Minot, N. Dak., on May 9.

E. H. Crofoot, City Water Superintendent, was appointed City Manager of Mason City, Iowa, on May 22.

W. P. Edmonson became City Manager of Pontiac, Mich., on May 23, to succeed William B. Schmuhl.

Charles W. Deterding, Jr., was appointed the first county executive under the new charter in Sacramento County, Calif.

H. C. Laughlin, Director of Finance, Kenosha, Wis., is now City Manager of that city.

George Liddle succeeded T. J. Pedler as Superintendent of Muskegon Heights, Mich., in May.

Fred M. Lockwood was recently appointed City Manager of San Diego, Calif.

T. J. Pedler recently succeeded Burt P. Hatch as City Manager of Muskegon, Mich.

A. E. Stockburger became the first City Manager of Ventura, Calif, on June 15.

W. M. Wiggins is the first City Manager of Wilson, N. C.

ORIN F. NOLTING,
Assistant Director, The International City Managers' Association.

Neglected Tract Made Beautiful and Useful for $3,000

By MICHAEL M. CHUDY

City Assessor,
Johnstown, Pa.

SEVERAL years ago the city of Johnstown purchased a tract of land for some $250,000. It had once been a natural beauty-spot, but had become covered with underbrush and was completely out of use. In meeting the recent need for unemployment relief, through the efforts of Dan R. Schnabel, a member of the City Council, and the local Emergency Relief Committee, a plan was worked out whereby some real good could be derived at no additional cost to the city.

Mr. Schnabel put a number of men at work on the neglected tract, first in grading and draining the land, for it was discovered that a swamp, part of an old lake bed, was making the entire open field unusable. Ditches averaging 3½ feet deep and 2 feet wide were dug and filled to within several inches of the surface with slag; the top soil was then restored. Thus the semi-swamp land was made usable.

Seven tennis courts were built and drinking fountains installed at the courts and other points. Walks, drains, etc., were made around the courts, and spectators' benches were built on the grounds. Three horseshoe courts were laid out and six safety swings were put up. A refreshment stand and caretaker's storeroom, and a toilet building, were erected. All this was done with relief labor, the only cost being for material—and much of that was donated.

Next, the underbrush was cleaned out of the wooded section; dead wood was cut down and sawed into kindling for picnickers. A pavilion was built according to the state plan of construction. Out of an almost inexhaustible supply of field stone on the hillside, outdoor ovens were built, and shelters were erected over them, using lumber from the woods.

Two old springs were rediscovered. The city and state bacteriologists tested the water and pronounced it unusually pure, and at once the springs were utilized. Among the relief workers were a number of skilled stone masons, so that some very beautiful stone work was done. Many tables were built on the grounds to provide for picnickers. A distinctive touch of beauty was brought about by the erection of two rustic bridges. Beautiful field-stone entrances were made, giving a very inviting effect to the park.

If the figures were not at hand to prove that the entire beautification cost was less than $3,000, it would seem improbable that so much work could have been done with so little money. The grove, now known as Roxbury Park, is a great attraction to the people of Johnstown and the surrounding country. Everything in it is free to the owners of it—the public.

VIEWS IN ROXBURY PARK, JOHNSTOWN, PA.
At top, looking from the slope of the park towards the tennis courts and baseball field. Mr. Schnabel, who sponsored the work, stands in the foreground. In the middle picture the children and the safety swings make a happy combination. The bridge shown at the bottom has the name of the park worked out in the rustic side panel

Equitable Adjustment of Charges for Treating Trade Wastes—I

By SHEPPARD T. POWELL
Consulting Chemical Engineer, Baltimore, Md.

TRADE waste problems are the ultimate sequence of industrial expansion. The more highly a community is industrialized, the greater will be the need for waste control. The magnitude and diversity of these problems are increasing so rapidly, in many localities, that effective control and abatement of existing and future pollution of land, air and water appears to be an almost insurmountable task. This condition is particularly disquieting in view of the existence of many federal, state and municipal control boards and commissions created within the past few years. It would be unfair and misleading to indicate that their various agencies have not made an earnest effort to cope with the situation or to presume that all such efforts have been in vain. In certain sections, marked improvement has resulted from intelligent legislation and cooperative effort between these regulatory bodies and the industries. Notwithstanding these hopeful signs, it is an established fact that industrial waste problems are outstripping the best effort of those whose function it is to effect an economical and rational balance between intelligent regulation and industrial expansion.

The present discussion will be limited to the waste products discharged into surface watercourses, or into municipal sewerage systems.

Possibly the best definition of waste is that proposed by T. Andrews as "matter with the wrong environment." It is conceded that, in many industries, waste by-products are created which must be disposed of rapidly, in order that the industries may continue to operate. How then may this be accomplished without unduly penalizing the specific industries or placing a burden upon others in the communitty? The solution of these problems is an economic question of far-reaching effect which may not be accomplished merely by the passage of regulatory laws based upon preconceived ideas of industrial efficiency or upon a generalization of desired conditions.

Many laws regulating trade waste stream pollution are inadequate, since there is insufficient knowledge for the evaluation of pollution intensity of the contaminating materials. This deficiency is universally recognized. The only available recognized standard measurement is the oxygen-consuming index of the specific wastes expressed in terms of biochemical oxygen demand. From these data an attempt is made to evaluate the prejudicial effect of industrial by-products in terms of equivalent sewage volume or equivalent population contributing specific volumes of domestic sewage. Under conditions restricted to organic wastes or other reducing agents, such a measure is relatively satisfactory. All waste products, however, do not fall within this group and regulations of the quality and quantity of such substances for discharge into streams are grouped under the general discretionary power of legal authorities. Equitable regulation frequently is difficult and engenders a spirit of distrust between the industries and regulatory groups.

Responsibility of Industries

One of the primary causes of the existence of this great problem may be traced to the wasteful practices which are prevalent in almost every industry. The present economic difficulty is focusing attention on this situation and may result in curbing steam pollution far more effectively than has heretofore been possible by governmental regulation. In the past, too much attention and effort has been directed to trade waste treatment when the solution has rested upon trade waste prevention. A thoughtful review of American industries must reveal the fact that our financial success in many cases has resulted, not because of efficiency, but in the absence of proper management.

The present difficulties arising from industrial waste would largely disappear if the same degree of research and development which has energized industries were applied to these problems. Unfortunately, the approach for relief has been directed toward correction and not prevention and, except in isolated cases, constructive research has not been the motivating force in the search for relief.

In a great many instances the waste matter has no marketable value or the cost of reclamation exceeds the market price of the products recovered. Unfortunately, this is generally an assumed condition for which there is no supporting evidence. This attitude is frequently responsible for vacillating industrial policies prevalent in many districts. As has been previously indicated, trade waste investigation and correction cannot be solved by any universal treatment. The types of industrial by-products cover a wide range and frequently are complex compounds the elimination of which requires the services of persons highly specialized in plant design and control. Although there are no standard forms of treatment, generalized investigative procedure is possible and, when properly planned and intelligently carried out, serves to point the way to adequate corrective measures. No intelligent or equitable policy can be developed unless a thoroughgoing study as outlined has been made and the data collected analyzed with respect to all interests involved. Many of the stream pollution investigations have included certain phases of these problems, but few, if any, have studied the broader economic aspects or analyzed the conditions in respect to all of these factors. The failure to visualize the existing situation may be traced largely to a restricted viewpoint of the investigators and the over-emphasis on purely localized interests at the expense of the broader economic losses.

Industries creating liquid wastes are faced with the alternative of absorbing such by-products within their plants or discharging them directly, or through public or private sewage systems, into inland or coastal waterways. Disposal in an equitable manner is of paramount interest and is dependent upon three major factors, namely, (a) character and volume of products produced, (b) location of the industries and availability of watercourses, and (c) adequate sewerage facilities. From the viewpoint of the manufacturer, all wastes which cannot be easily and economically recovered may be removed most satisfactorily by discharging them into surface watercourses. If the rights of others were not a consideration, such a procedure might be condoned. Watercourses have a limited and definite capacity for assimilating waste products, but beyond these limits nuisances arise.

Disposal by Dilution

Disposal of wastes by dilution only is a function of the character of the products discharged into the diluting body of water and the existing or future pollution load on the specific body of waters. Disposal by dilution is a practical procedure and is practiced widely. Difficulties arise only when the pollution load exceeds the safe purification of the natural watercourse. The interpretation of common laws controlling water pollution varies but generally follows substantially that given in Lord Macnaghten's summary in the case of *Young v. Sankier Distillery Company et al.*, decided by the British House of Lords in 1893. A portion of this record is as follows:

> "A riparian proprietor is entitled to have the water of the stream on the banks of which his property lies flow down as it has been accustomed to flow down to his property, subject to the ordinary use of the flowing water by upper proprietors, and to such further use, if any, on their part in connection with their property as may be reasonable under the circumstances. Every riparian proprietor is thus entitled to the water of his streams, in its natural flow, without sensible diminution or increase and without sensible alteration in its character or quality. Any invasion of this right causing actual damage or calculated to found a claim which may ripen into an adverse right entitled the party injured to the intervention of the court."

The principles laid down in this decision apply in general to pollution of streams by municipalities, individuals, or industries.

Equitable stream control measures are difficult owing to the deficiency of our knowledge to determine quantitatively pollution intensity factors of miscellaneous waste, and to a lack of uniformity of laws extant in states contiguous to interstate or coastal waterways. It is difficult to conceive that a simple standard can be devised that determines the admission or rejection of contaminating materials into waters. Considering the factors involved in the problem, adequate adjustment must rest largely upon the judgment and experience of the person or persons in whom regulatory control is invested.

It is axiomatic that the discharge into streams of certain types of matter should be prohibited. In this group are all products that are certain to result in fire hazards, or are definitely deleterious to the health, life or comfort of persons. Aside from these specific by-products, the admission into watercourses of many waste products with or without previous treatment frequently leads to controversy, since the decision is largely a matter of viewpoint of the various groups involved in the controversy. Since these conditions exist, ultimate stream control methods to be equitable and effective must rest upon an educational program and an enlightened conception of economic factors involved. A careful survey of the major stream pollution programs will reveal the importance of this viewpoint. In the final analysis the solution of the problem is strictly a function of the industries, since it involves their own welfare and development. It is difficult to understand, therefore, why trade waste correction is so seldom initiated by the offending group but is given serious consideration only after pressure from legally authorized groups.

This condition was demonstrated in a recent investigation. A steel mill in the East was discharging fairly large quantities of pickling liquors into a stream from which cooling water was drawn for use in surface condensers by a large public utility. The electric company furnished power to the offending steel mill. The acid waste resulted in loss of condensor tubes to the extent of about $5,000 a year. The utility company refused to discuss the matter, since the mill in question was a consumer of power. The interesting sequence of this condition is that the power company could have utilized the pickling liquor waste as a coagulant for clarification of the boiler feed water, and the two properties were sufficiently close to have pumped the waste directly to the water purification plant.

A similar case of pollution of a stream in Maryland by pickling liquors was partially corrected without any capital investment. In this instance the annual cost of sulphuric acid was reduced $25,000 per year, merely by accurately controlling the dumping of the waste. Prior to the investigation these wastes were discharged whenever the operator decided such was necessary, the test procedure being merely to taste the pickling liquor and so determine its strength. The saving noted was effected by placing this operation under laboratory control procedure.

An Unnecessary Loss

The writer recently investigated an industry on the eastern seaboard which has sustained a loss of salable grease amounting to more than $500,000 within a period of ten years and has expended, in addition, upward to a hundred thousand dollars on legal and expert fees in defense of damage suits resulting from the grease discharged into a tidal water. By a relatively simple recovery system not only the grease from this industry could be recovered but also a large amount of organic material for which there was a ready market. The proposed recovery system could have produced a liberal return on the capital investment. The works closed before the proposed system was installed. These examples are by no means rare cases but indicate a state of affairs which is prevalent in many highly industrialized centers.

Pulp and paper mill manufacturers through the American Paper & Pulp Association reported that with a capital expenditure of as little as $41,000, fiber losses have been reduced from $160,000 to $30,000 annually. These frank admissions of enormous losses constitute a serious indictment against existing extravagances which are duplicated to a greater or lesser degree in practically every important industry in this country. In face of these facts it is difficult to account for the general apathy which, up to the present time, has been manifested toward all industrial waste problems and which has been dispelled only by pressure from health authorities or similar groups.

(To be continued in the August issue)

Renovating a Sewage Disposal Plant

By P. J. GOODWIN

Conservation Engineer, State Board of Control, Charleston, W. Va.

THE WESTON STATE HOSPITAL SEWAGE TREATMENT PLANT

Showing the new filter bed in the foreground, the dosing chamber in the rear, the chlorinating house and the after-settling basin in the right foreground, and the Imhoff tank in the right background

A COMPLETE sewage disposal plant was installed in 1918 at the Weston State Hospital for the insane in Weston, Lewis County, W. Va., on the banks of the West Fork River. This hospital houses about 1,600 patients and the necessary help and staff for their care and maintenance. The per capita water consumption is high, owing to the character of the institution, and the sewage, of course, is rather objectionable, on account of the type of patients cared for in the hospital. The West Fork River is a small stream that practically ceases to flow in the late summer months, and yet it is the only source of water supply for the city of Clarksburg, located further down the stream. This sewage treatment plant, we believe, was the second of its kind in West Virginia in 1918, and the cooperation of the state in its establishment to help clean up the pollution in this stream is most noteworthy.

The Original Treatment Plant

The plant consists of a complete sewer system—collection sump and pump house, discharge line to treatment site, Imhoff tank, sludge bed, dosing chamber, trickling filter bed, chlorinating house, secondary settling basin, and effluent line. The main sanitary sewer empties into a combination screen and collector basin at the pump house, where the large non-soluble solids and rags are removed. The sewage is then pumped through about one-half mile of cast iron discharge line to the treatment plant site and delivered into a large Imhoff tank. Here the sewage coming from the pump plant is relieved of its heavier solids. By a change of velocity, proper baffling, and a long retention period, the solids are collected in the bottom of the Imhoff tank, where they are subject to septic action. The liquid, containing only a small amount of fine, light solids, flows to the dosing chamber. After septic action is complete in the Imhoff tank, a brown sludge is left in the bottom. This is drawn off about twice yearly to the sludge bed, where it dries quickly into a non-offensive fertilizer.

The drain from the sludge bed filter goes direct to the chlorinator house for sterilization. The dosing chamber, which receives the effluent from the Imhoff tank, is slightly elevated above the trickling filter and is equipped with automatic flush valves to release the liquid periodically to the spray heads over the main filter bed. By this process the effluent is aerated and properly distributed over the surface of the filter bed where the finer, floating solids are deposited, while the filtered liquid passes on into the chlorinating house. Here the effluent is thoroughly sterilized with chlorine and passes into the final settling basin. After passing over a wide weir at the end of the basin, it is discharged into the sewer line leading to the river below the water dam and the town.

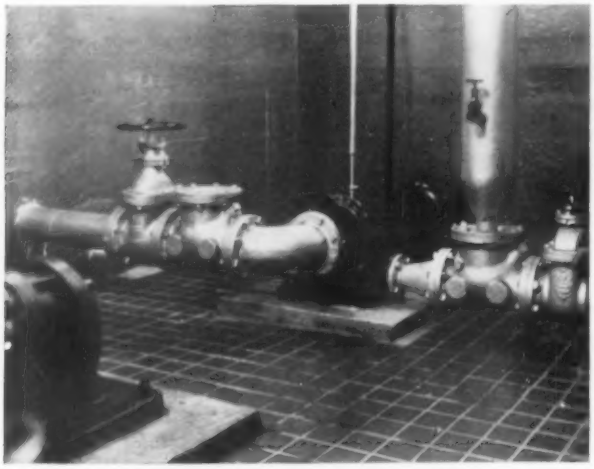
In the treatment of the sewage at Weston State Hospital an excellent record has been maintained for the past few years, as evidenced by the weekly bacteriological tests conducted by the Chief Chemist of the Clarksburg Water Board. An effluent many times purer than the river water is constantly maintained.

Reconstruction Increases Efficiency

Owing to the fact that the plant was installed in the stress period of 1918 when labor and material were both hard to get and hard to control, the plant began to deteriorate, and in 1931 an appropriation was made for its reconstruction. An inspection showed that the concrete had begun to weaken, that some soft stone in the filter bed was disintegrating, that the discharge line was constantly failing on account of pressure disturbances and the type of joint originally used, that the pumps were incorrectly designed and inefficient, and that maintenance and operating costs were too high. It was in the rebuilding of this small plant, with twelve years of experience in the operating of it, that many faults were corrected and valuable data obtained. It will be of special interest to those contemplating the installation of small sewage disposal plants to have the benefit of this experience and to know that by correct design such plants may be operated and maintained at very low cost.

The pump house stands on low ground and is immediately in front of the collection sump. In the rear of this building is the electric transformer substation which furnishes the current for operating the sewage pumps and the automatic float switches by which the pumps are automatically controlled to handle the varying flow to the pit.

The former pumps were of the double suction centrifugal type, each being driven by a 30-hp alternating current motor. Each had a rated capacity of 500 gpm against a total head of 130 feet. Actually, each of the pumps



ONE OF THE NEW SEWAGE PUMPS, SHOWING THE DOUBLE CHECK VALVES AND THE AIR CHAMBER TO REDUCE LINE SHOCK

when operating with free impellers required 32 bhp to operate, and the line shock or water-hammer was very excessive on stopping. The impellers, being of the enclosed type, were narrow and consequently partly clogged a great deal of the time, cutting down the capacity. This required the cleaning of the impellers once or twice a day. The shock on the line discharge was so great that repair to pipe joints was a weekly affair, and sometimes this class C cast iron line was completely split open.

New Pumping Units Cut Costs

To overcome the expense of excessive current use and maintenance, new pumping equipment was installed. Great care was given to the choice of pumps to insure non-clogging qualities, high efficiency and proper capacity. The choice was a 220-gallon-per-minute Allis-Chalmers pump operating against a head of 96 feet. This pump is of the single suction type capable of passing 2-inch blocks and originally designed as a stock pump for the paper industry. It is efficient, requiring only 8.62 hp to drive, and is connected to a 10-hp motor. By saving about 34 feet in the frictional pumping head, and operating on nearly one-fourth the original demand, it has been possible to reduce the pumping cost and to save approximately $100 per month in current expense.

There has been but one case of clogged impeller, and this occurred before the installation of the double system of check valves—one on the suction line and one on the discharge line. To insure against back flow, this double check valve system was installed, and it has never failed. To minimize the line shock, an air chamber was put in the cap of the discharge check valve. Since the pumping plant was revamped, there have been only three line repairs, and these were at the places already weakened by the terrific shocks of the old dumping system, since the discharge line had not been tight except after the last repairs.

The discharge line was not originally laid with a lead and oakum joint and, possibly owing to bad pouring of the original compound or to the action of sewage upon it, combined with water-hammer, the line was never satisfactory. It has been completely re-corked with lead and oakum, and the joints are giving us no trouble.

Repairing the Units in the Plant

The original hopper baffles in the Imhoff tank gave way and had to be replaced. There were no cross-baffles in the tank as originally installed and of course this gave an opportunity for carrying over a larger portion of the final solids and placed a heavy burden upon the filter bed. Cross-baffles were installed, and a great deal of improvement in the character of the effluent from the Imhoff tank was noted. The improvement showed up principally in the spray nozzles, which would previously stop up, owing to light material going through and clogging the nozzle.

While the plant was being rebuilt, the entire underdrain system from the sludge bed was relaid.

The dosing chamber concrete work was especially good, and the automatic flush valve was in good condition, so that it was not necessary to make any repairs on this tank. The main concrete walls of the filter bed, because of poor material and workmanship, were very much disintegrated, and the entire wall had to be replaced. In this work a mixture of 1:1½:3 concrete was used and very fine, close-grained walls were the result.

The material in the filtering bed consisted of native sandstone, but because a small amount of soft, fine sandstone was not eliminated from the original bed, it disintegrated rapidly and the bed pooled in spots. The greater part of the bed consisted of hard native sandstone; samples of this were sent to the University testing laboratory and proved equal to the best grades of prepared limestone and slag, even after twelve years' service. Inasmuch as there was sufficient institution labor to wash and sort the stone, the entire filter bed was removed, washed and replaced, saving approximately $4,000 for new stone.

There had always been a great deal of trouble with the cast iron extensions. They either corroded rapidly or split from weather exposure. The extensions have all been replaced with cast bronze, and are giving much better service.

The old type of chlorinator proved rather ineffective, for it was subject to freezing, so a Wallace & Tiernan type M.S.P.M. chlorinator, with a standard automatic water heater, was installed to slightly warm the water used in the chlorinator.

As in the main walls of the filter, the walls of the final settling basin showed signs of disintegrating, and a complete new concrete final settling basin was poured, all at one time. The concrete is hard and dense, and shows no deterioration. No repairs were necessary to the effluent line leading from the final settling basin to the river.

Beautifying the Plant

After the plant was completely rebuilt and put into operation, the ground surrounding the different units was entirely regraded and grassed. On one side of the filtering bed was a ravine which at times washed under the corner of one of the walls, and this was drained by installing a 36-inch tile line across the entire treatment plant site.

We wish to express our appreciation of the assistance given in the rebuilding of this plant by Professor L. B. Carpenter of West Virginia University, in testing the materials; and of the cooperation of the Engineering Department of the State Board of Health, the Clarksburg Water Board, and J. A. Henry, plant engineer.

Water-Softening Plants for Small Cities

By HOWARD R. GREEN

Howard R. Green Company, Consulting Engineers, Cedar Rapids, Iowa

THE problem of designing water-softening plants for the small city, so that they will accomplish the desired results and be at once easy to finance and simple to operate, offers a field of study worthy of the engineer's attention. Whether the engineer's remuneration on such small projects warrants the expenditure of time required to properly care for the many details is another problem. To be sure, some items of design can be so standardized that they may be applied to future projects; but no general standardization seems possible with safety. Each city has conditions peculiar to itself; each project is an individual problem.

There are two elements of design which will be found to apply to all small city conditions: the cost must be kept low, and operation must be made simple. To accomplish these two objectives, much study may be necessary to scale-down conventional items of equipment to fit the capacity and financing requirements of the small municipality. Therefore, the designer must exercise considerable ingenuity, more perhaps than would be required for an orthodox layout of larger size. He must keep in mind that the plant operator may be not particularly well trained nor fitted to vary plant operation to meet fluctuating conditions. Therefore, at every possible point constant conditions should be provided for. From the engineer's viewpoint, the small city problem is intensely interesting, but it is one in which the satisfaction of accomplishment must make up a large portion of his remuneration.

The City's Point of View

Whether or not the small city should undertake the softening of its water supply requires considerable thought. There is no denying the advantage of a soft water supply. The enthusiasm of consumers for such a commodity after it has been developed seems almost unanimous, but its installation requires a certain capital investment and equally certain operating costs. If convenience rather than economy to consumers is the only visible result of these costs, then the plant must be classified as a luxury, and luxuries payable from the public purse are not too popular during the present exchange of ideas on public economy.

It is quite easy to demonstrate on strictly conservative grounds that the soap saving to consumers by reason of reducing, say, a 20-grain water to 4 or 5 grains of hardness, will not only compensate for the capital and operating expense of the softening plant, but will save the consumer most, if indeed not all, of his yearly water bill. This has been proved frequently despite the fact that the city has to soften *all* the water distributed in order that the small quantity actually needing softening by the consumer may be ready for delivery to him. In other words, the city has to soften fifty to eighty or more gallons per capita per day with its municipal plant, whereas the consumer only "breaks" two or three gallons per capita per day with soap for laundry, culinary and bathing purposes.

Take a city of 6,000 population using an average of 77 gallons per capita per day, or a total of 462,000 gallons per day, the water drawn from relatively shallow wells having the following analysis:

	Parts per Million in terms of $CaCO^3$	Grains per Gallon
Alkalinity	405	23.8
Non-carbonate hardness	0	0
Total hardness	296	17.4
Sodium bicarbonate	109	6.4
Magnesium (Mg)	31	1.8
Iron (Fe)	3.2	0.2
Free CO_2	12	0.7

After aeration and filtration, 0.49 ppm of iron left in water.

Based on previously published municipal surveys, the operating cost comparison is about as given in the following statement:

The cost of softening this water with a municipal plant from 17 grains of hardness down to 3 grains of hardness, using excess lime and recarbonation method, would approximate 2.8 per 1,000 gallons, or a daily cost for softening the 77 gallons used by each person, of	$0.00215
The cost of softening the total supply of each person for a year would be	788
Assume the average requirement for soft water for each person per day in gallons	1.2
The required reduction in hardness in parts per million is	238
The soap required is 0.2-lb. per 1,000 gallons per part per million of hardness reduction. This amounts to 47.6 lbs. per 1,000 gallons, or an amount of soap required to soften 1.2 gallons per day, of	.057 lbs.
Assuming a cost of soap of 12c per lb., the daily cost per person to soften the water actually required in household uses would be	$0.00685
The cost of soap per year per person should approximate	$2.47
Now deduct the cost of softening 77 gallons per day per person for one year as shown in the second item	0.79
The saving per capita in this case for a one-year period would approximate	$1.68
Assuming an average of four persons per connection, the yearly saving per consumer would be	$6.72
Applying these figures to the population (6,000), the gross saving would approximate per year	$10,080.00
The cost of constructing the complete softening plant for the above conditions, using present-day construction and machinery costs, is approximately	$35,000.00
Or a capital cost per capita of	5.83
Or a capital cost per consumer of	23.32

It is therefore apparent that, even in this borderline case, the annual saving to the community is amply sufficient to finance the interest and principal retirement charges and would retire the total funded obligation in a very short period of years.

Savings Are Individual, Not Municipal

Unfortunately, however, the apparent handsome economies enjoyed by the community do not appear on the books of the water department as increased income. The only new items appearing on the ledger are a substantial increase in the cost of operation of the municipal water department and the necessity of retiring the interest and principal of a new funded obligation.

The obvious answer to the above financial situation is that if the city saves the consumer $6.72 per year, the consumer should not object to having his water rentals increased $2.72 per year, thereby leaving him a personal profit of $4.00 and assisting in retiring the capital expenditure of the city in slightly more than a 10-year period. But the public seldom takes an unbiased view when utility

rates are under consideration. An increase in rentals, be it ever so slight, does not tend to popularize the improvement which causes it, regardless of the benefits accruing to the consumer.

Softer Water Increases Consumption

There is one possibility of additional revenues other than an increase in rates. In municipal water-works systems where conditions are at all acute or distasteful a distinct reduction in consumption per capita is evidenced. Private wells and cisterns with their potential dangers come into popular use. An improvement in the quality of water delivered to the consumer may be reasonably expected to have the effect of increasing the consumption per capita without a proportional increase in operating costs. This item of additional revenue cannot definitely be forecast, but there is little doubt that it exists and has a beneficial effect on the department's balance sheet.

The Small City Plant

The greatest hurdle which the engineer accustomed to designing large water softening installations must take in approaching the small city problem is to realize the change in ratios existing between various factors of control as compared with the large municipal installations. Take, for example, a city of 2,000 population, the pumping records of which indicate that 70 gallons per capita per day is the maximum demand. So far as domestic consumption is concerned, this would require 140,000 gallons per day. Obviously, the lowest first-cost plant to produce this quantity would be one which would operate uniformly 24 hours a day, or at the rate of approximately 100 gallons per minute. At this point, the question of fire protection must be introduced. As a minimum requirement, assume that ¾-inch nozzles operating at 40 pounds pressure at the base of the play pipes are standard equipment in the town, and that two of these nozzles will be required for a 5-hour period. The total water consumed would approximate 212 gallons per minute, or something over 63,000 gallons for the period. This quantity of production must be provided for in the design of the plant, unless it is possible to by-pass the raw-water supply around the softening plant safely during a conflagration. Assuming that the water must be treated, this fire protection reserve added to the maximum domestic consumption would bring the total requirement up to 203,000 gallons per day, which is equivalent to a constant rate of 140 gallons per minute. Therefore, with the plant operating at this rate, the domestic consumption requirement could be produced in about 16 hours of operation.

This 16-hour period of operation is too long for one employee to handle; therefore, two shifts would have to be arranged. As a conservative assumption, say that the only additional cost by reason of two-shift operation is the salary of the operator, and that this item would amount to $1,000 per year. Consideration must be given to the fact that this annual expenditure would pay 5 per cent interest upon and retire a principal amount of $12,500 over the maximum 20-year legal financing period under which the city must work. It therefore appears that it would be economy to design the plant for a maximum expected domestic consumption on the basis of a 12-hour daily operation period. This would raise the rated capacity of the plant to 200 gallons per minute in order to produce the 140,000 gallons of daily consumption in a 12-hour period. The possible 24-hour operating period would provide an ample factor of safety for fire protection purposes.

Another element prohibiting the scaling-down of the plant to a 24-hour continuous operation to produce the required domestic load is the shortage of elevated storage capacity usually discovered upon investigating conditions in the smaller cities. Far too often this storage capacity at a usable elevation is too small to carry over the peak domestic consumption period and still allow an adequate fire protection reserve.

Still another element which indicates the inadvisability of designing a plant which must operate 24 hours a day to produce the combined domestic and fire protection requirements is the fact that in these small units the cost of duplicating certain major items of equipment is prohibitive, and therefore the plant must be laid out of operation for a period of hours sufficient to complete ordinary maintenance and repairs.

None of the above items of influence run parallel with the requirements or conditions in larger municipal plants. The ratio of fire protection to domestic requirements in the latter case is very much smaller. Unit construction usually provides for adequate duplication of equipment; 24-hour operation in larger installations is a real economy. All these things tend to keep the cost per capita of the plant lower as the population increases.

Cost of Construction

Owing to industrial and commercial demands, the consumption of water per capita in larger cities is normally one and one-half or more times as much as in smaller communities. Despite this fact, the economies of design possible in the larger installations more than offset the advantage thus gained by the small towns.

If it be assumed that a complete large city plant can be constructed on the basis of $40,000 per million gallons per day capacity, and that the water consumption per capita, taking into consideration industrial and commercial requirements, is 100 gallons per day, a $40,000 investment will provide for 10,000 population, or a cost per capita of $4.00. In the case of the smaller communities, this basic estimating price would probably rise to $60,000 per million gallons capacity. If the per capita requirement is 60 gallons per day, then a million-gallon plant would provide for a 16,666 population, or a per capita cost of about $3.60. But the above comparison is made on the basis of 24-hour operation, which probably could not be put into effect with any economy in the small town, and if a 12-hour operating schedule is adopted, the effect is to double the required capacity per capita with a like increase in construction costs, making the estimated expense $7.20 per capita.

While the above comparison of costs is purely illustrative, it does give a fair idea of existing conditions. The latter unit cost estimate should hold good at the present time for a population of approximately 4,000. For populations over that amount, the unit cost should be decreased, and the reverse would be true in smaller communities.

Based on the investigation of several small city projects, it seems safe to generalize to the following extent. The public demands a potable water, but, having tolerated hard water supplies for years, it is not convinced in ad-

vance of the benefits or desirability of installing municipal softening works. Upon experiencing these benefits, it becomes enthusiastic. The installation of municipal softening plants is not practical in all cases, but it is possible to make a definite forecast of results and cost in each case. Where a potable soft water can be produced, the municipal plant will show an increase in consumption and gross returns, but a loss in net revenue unless rates or rentals are somewhat increased. The saving in soap to the community will usually equal the total water bill of the consumer, but he will usually object to sharing this saving with the water department in the form of increased rates. Municipal water softening should not be the subject of general propaganda. The decision as to its advisability in any case should be made only after careful investigation.

ACKNOWLEDGMENT—From a paper presented before the Eighteenth Annual Meeting of the Missouri Valley Section, American Water Works Association.

Maintenance of County Road Equipment

Methods Used by Washtenaw County, Mich., Keep Trucks in Prime Condition

By LEIGH D. TOWNSEND
Engineer Manager, Washtenaw County, Ann Arbor, Mich.

THE OFFICE AND SHOP BUILDING AND PAVED COURT OF THE WASHTENAW COUNTY BOARD OF ROAD COMMISSIONERS, ANN ARBOR, MICH.

THE Maintenance of Equipment Department of Washtenaw County, Mich., has six full-time employees, including—foreman, storekeeper, storesclerk, blacksmith and two mechanics. The repair shop, with all the necessary tools and equipment, will accommodate five large trucks and a gasoline shovel or other large piece of equipment, all of which may be overhauled or repaired simultaneously. A woodworking shop is located in the main yard, where repairs and replacements of cabs and bodies may be handled. The machinery for this shop was included in a property and building purchase at the time the yard was enlarged, and therefore the county's investment is small.

The main pieces of equipment in the shop are a motor cylinder boring machine, one large and one small lathe, a large shaper, a drill press, a power grinder, a 200-ton hydraulic tire press, a mono-rail chain hoist, a chemical grease removing tank, a 100-pound power hammer, power hack saws, welding and cutting apparatus, an electric valve grinder and seater, a paint spray apparatus, a Skinner oil reclaimer, and a 12,000-gallon gasoline storage tank, complete with tank-car pumps and electric dispensing pumps.

The county automotive equipment consists of fifty trucks from the so-called pick-up Ford and Chevrolet class to the 3-, 4- and 5-ton Packards of war vintage. In addition, there are three gasoline shovels, two portable gravel-screening plants, complete with belt conveyors, crushers and screens, crawler tractors, power graders, a gasoline roller, a large-capacity gravel-washing plant, and numerous other pieces of road maintenance equipment.

Oil Reclaiming

On February 1, 1932, the Board of Road Commissioners placed in operation, for trial, a Midget Model Skinner lubricating oil reclaimer, but as it was under capacity for our requirements, it was exchanged for the next larger size, the Junior Model, on April 1, 1932. This model was entirely satisfactory and effected a real cost saving and the reclaimed oil is of excellent quality.

The machine is not operated continuously, for the quantity of oil to be reclaimed does not warrant it. If it were operated 24 hours a day, however, a greater saving would be effected. In the operation of this unit a heating coil is first started, which heats the oil, filter pans, etc. When the unit is shut down, these parts cool, and the filter pads crust over, and if the crust is heavy, it is necessary to renew the top pad before operating the

THE REPAIR SHOP
Showing the blacksmith shop beyond the fire door, and a power grader, three trucks, a crawler tractor and a portable gravel screening plant being overhauled simultaneously

THE TRUCK STORAGE SECTION OF THE SHOP BUILDING

The vacuum-steam heating boiler is located at ground level near the cab of the grader shown in the center of the photograph, and the Skinner oil reclaimer is seen at the right

machine again. Without cooling, however, the top pad would probably filter 25 to 50 gallons additional. The average life of one filtering pad is about 100 gallons of oil. The pads cost $1.50 each, or $0.015 per gallon. The unit requires 15 amperes, operating at 220 volts, the energy consumed being 3.3 kilowatt-hours, which at the 5 cent rate paid in Ann Arbor is 16.5 cents. Conservatively figuring the life of this machine at five years, the yearly depreciation would be $130, or roughly $10 a month. The labor item is practically nothing; for purposes of cost records, however, the county estimates one hour per day for one man. With these charges, it has been found that the cost per gallon for reclaimed lubricating oil is 12.5 cents. A check meter has recently been attached to the machine, which it is believed will show a lower power consumption than is rated.

Up to January 1, 1933, the machine had reclaimed 1,500 gallons of oil. The county had been paying 50 cents per gallon for new oil, and since reclaimed oil may be used instead of new oil, and as satisfactorily, the saving per gallon is 37.5 cents, or $562.50 for the first nine months of operation.

The question was raised as to whether the quality of the reclaimed oil was as good as that of first-grade new oil. Tests by the staff of the Board of Road Commissioners with the aid of University of Michigan chemists have led to the belief that there is no basis for doubting the statement that the reclaimed oil is actually better than new oil. It has been found in overhauling the county trucks and other equipment, that cylinder blocks previously worn 0.010 to 0.015-inch during a definite period of operation, are worn not more than 0.005-inch. This was particularly true with No. 17, which is equipped with a Pneu-Hydro scraper and travels in low and second gear practically all the time. Because of the limited quantity of reclaimed oil, not all the trucks could use it, but truck No. 17 did, and it was in excellent condition after sixteen months of work. The records show that reclaimed oil lasts longer than new oil without replacement and has no bad effects on the motor. The only difficulty which has been experienced is in the need of an educational program to convince truck and tractor operators that the color of the oil has nothing to do with its performance, since the reclaimed oil appears to be black.

Unless Citizens Cooperate, Town Planning Cannot Fully Succeed

THE 1933 Report and Survey of the West Essex (England) Advisory Joint Town Planning Committee, listed on page 69 of this issue, contains in its Foreword a strong plea for citizen cooperation with the official body. The similarity of this need to that of American city and regional planning commissions is evident from the following excerpts:

"This report will have served its purpose only when the working-out of each separate part of the organization is finally welded into a coherent whole. Nor will the statutory powers of Local Authorities suffice in themselves to accomplish this end. Every man who takes pride in our district and every newcomer who claims a right to its citizenship must play his part. The largest property owner and the dweller in its smallest tenement may alike claim a share in its amenities. Without cooperative planning, both alike may have their share depreciated by the uncorrelated plan of a thoughtless neighbor. By cooperative planning, light and free passage, cheerful surroundings and spacious prospects may be shared by all, regardless of the conveyances and registrations which record the rights of individuals. Where administrative powers fail, voluntary cooperation can bridge the gap, and however strong the powers entrusted by the state, progress will be obstructed unless cooperation is the keynote of our venture.

"Cooperation must be whole-hearted. Though it may happen that a neighboring authority or individual has the greater betterment from our planning, there must be the firm belief that if the planning be coordinated and purposeful, betterment will in the end come to all. We must overcome disappointment if our first conceptions are thwarted by events which move faster than the general trend, and while each authority and individual is striving in his own quarter of the field, the progress of others will often be shrouded in mist and the common purpose obscured. Above all, we must meet the danger that, as each laborious stage in planning is accomplished, men may rest in false confidence, content with a well-designed map rather than the execution of the plan.

"There is only one choice before us. We need not go outside our own borders to see the folly of sporadic development, not so much in the product of the jerry builder as in worthy buildings, well planned for their own purpose, but wasted for lack of a wider vision to correlate them with any general scheme. Factories shut out from the arteries of distribution, terraced houses whose former gardens now project as one-storied shops into too narrow streets, all tell a story of capital wasted and rateable value destroyed by the thoughtless competition of isolated schemes of development where services which should have supplemented each other have developed only one aspect of general conformity—that of mutual depreciation.

"Only cooperative planning can save our district from such a fate. Though we may not live to see the full results of our labor, we yet can ensure that the foundations are sound."

An Attack on the Problem of the Disposal of Household Wastes — Part II

By FRANK K. DUNCAN
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The Furnaces

There are four furnaces arranged in a straight line, each of which has a normal capacity of 150 tons for each 24 hours. They were designed and constructed by the Pittsburgh-Des Moines Steel Co. under the patents of Edgar B. Kay. They are constructed of brick and are equipped to use force draft and preheated air. Each furnace is an independent unit and may be operated as a single unit or simultaneously with other units. There are four cells with a common furnace chamber in each furnace, each cell having a burning grate and an inclined drying grate without any separation between the grates of adjoining cells. The flow of gas from each cell may best be described as being in vertical planes. Therefore, the gas streams from adjacent cells are parallel and do not pass over the fires of other cells. Each cell has an independent charging hole in the roof of the furnace, located over the drying hearth, an individual ash hopper and independent draft control.

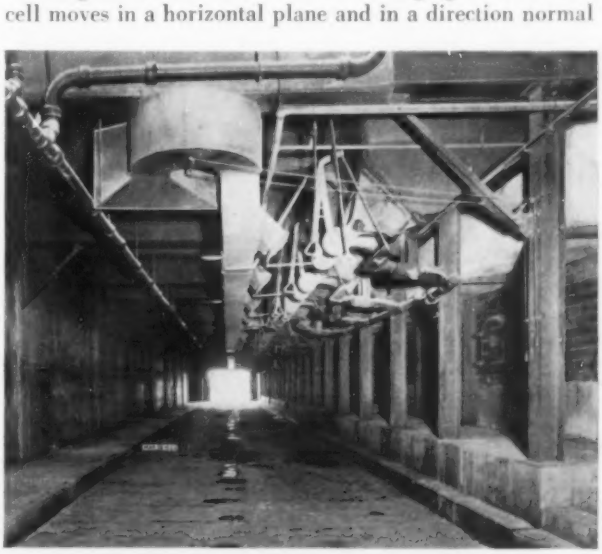
All exposed outside walls of the furnace, flues, etc., are built of ¼-inch steel plate, while the unexposed walls are built of common brick, 12 inches thick. They are lined with firebrick 13½ inches thick. An insulation of Sil-o-cel, 2½ inches thick, was placed behind the 12-inch brick walls, and the ¼-inch steel plates were insulated with 4 inches of Superex. The roofs of the furnaces are of the suspended flat arch type, 9 inches thick, insulated with 2½ inches of Sil-o-cel. The paving in the furnaces and flues consists of 4½ inches of firebrick laid on 2½ inches of Sil-o-cel. The furnaces are braced and held together by means of vertical buck stays and horizontal ties, and are constructed independent of the walls of the building.

Each cell is provided with stationary cast iron grates, resting on steel supports, constructed in three sections—two horizontal and one inclined. The total grate area in each furnace is 270 square feet, consisting of approximately 90 square feet of drying area and 180 square feet of burning area, thus providing a normal burning rate of 70 pounds of mixed refuse per square foot of burning area each hour. In the front wall of the furnace are located the guillotine firing doors, one for each cell. These doors are lined with 1½ inches of Superex insulation and 2½ inches of Firecrete and provide an opening 30 x 30 inches. A stoking opening 9 x 9 inches is provided in each door, equipped with a flap, so that the fires may be stoked without raising the door. A hinged dead plat 17 x 24 inches in the plane of the grates is located just behind each guillotine door, providing a means of discharging the furnace residue directly into the ash hoppers.

In the space below the grates of each cell there is constructed an individual ash hopper, with a capacity of about 5 cubic yards and completely separate from the adjacent hoppers. They are constructed of ⅜-inch copper bearing steel plates lined with 3-inch vitrified paving bricks laid in cement mortar. The bottom of each hopper is fitted with a 24 x 24-inch Beaumont pivoted ash gate, and the top is made accessible from the stoking floor, through a 15 x 24-inch door in the front of the furnace just below the guillotine door.

The louvre for the control of the preheated air is located in the back wall of the hopper just below the inclined grates, the valve being operated by a rod extending just beneath the grates and connected to a lever at the front of the furnace. A ¾-inch diameter quencher line extends along the two sides and the rear of the hopper, near the top. The pipe is of wrought iron with 3/32-inch diameter holes drilled in it at intervals of about 6 inches. Each quencher is connected to a 2-inch header near the ceiling of the ash tunnel and connected by a valve. The stem of this valve is connected to a rod extending upward through the stoking floor at the front of the furnace and downward to within reach of the ash man, when he is standing on the floor of a truck. The lever controlling the preheated air likewise extends downward to within reach of the ash man, as it is usually necessary to cut off the forced draft before dumping the ashes. With these arrangements, the quenching and forced draft may be controlled with equal facility from either the stoking room or the ash tunnel.

The gate in the chute above the charging hole of each cell moves in a horizontal plane and in a direction normal



THE ASH TUNNEL AT THE BALTIMORE INCINERATOR

ONE OF THE NEW COLLECTION TRUCKS, SHOWING THE KINNEAR ROLLING SHUTTERS IN THE CIRCULAR TOP

to the furnace front. It is operated by pulling on an endless chain hanging at the front of the furnace. The chain, running over a sheave, operates the gate by means of a rack and pinion. The charging hole cover attached to the lower side of the gate is a shallow cast iron box filled on the underside with Sil-o-cel C-3 concrete, poured in place, serving both as an insulator and a refractory, with an air space of about 3 inches between the top of the cover and the steel gate. This arrangement prevents the refuse in the hopper from coming in contact with the hot charging hole cover.

The burning gases from the four cells of each furnace pass over a bridge wall into a common combustion chamber extending the full width of the furnace chamber, or 29 feet, 1 inch, where they are subjected to a rolling action, thus insuring complete combustion and the destruction of odors and smoke. This chamber is 5 feet wide and 19 feet, 9 inches deep, providing a volume of 2,760 cubic feet or about 15 cubic feet for each square foot of effective or burning grate area. A port at each end of the rear wall at the floor level of the chamber allows the gases to pass either into the air preheating chamber before entering the main flue or to be by-passed directly into the main flue. These port openings are controlled by dampers operated by winches located on either end of the furnace near the front. Each damper consists of refractory tiles supported in a frame of alloy steel containing 16 per cent nickel-chrome. The weight of the refractory is carried by a bottom yoke, which hangs on four 1¾-inch rods made of the same alloy steel.

The Air Preheater, Flues and Chimney

An air preheater is provided for each furnace. It is a rectangular case 6 x 9 feet by 6 feet high, supported on the refractory wall of the preheater chamber. The sides are made of 3/16-inch steel plates, and the top and bottom are cast iron with holes to accommodate the cast iron tubes.

There are 162 tubes 4 9/16 inches outside diameter and 5 feet, 4 inches long, presenting an external heating surface of 866 square feet. Air from the forced draft fans enters one end of the preheater near the bottom and leaves at the same end near the top. A baffle plate in the preheater separates the air travel. The hot gases from the furnaces travel through the tubes, entering at the top. The top and bottom plates are protected on the outside with 4 inches of Sil-o-cel C-3 concrete. A sectional cast iron cover, the bottom of which is filled with 1½ inches of Superex insulation and 2½ inches of Firecrete, provides easy access to the tubes for cleaning or repairs. The cover is 5 feet, 9 inches above the preheater and rests upon the top of the preheater chamber walls.

The forced draft fans, one for each furnace, are Buffalo single Turbo No. 4½ with a capacity of 10,200 cubic feet per minute at 6.5 inches static pressure, driven by a 15-horsepower variable speed electric motor at 1,775 rpm. Air may be taken from outside the building or from that part of the building which houses the furnaces and flues, by means of a butterfly valve in the intake.

Air from the preheater passes through a duct to a header extending along the front wall of the combustion chamber in the ash tunnel. Lateral ducts carry the air from this header to each of the louvre boxes under the grates. The main duct is 24 x 30 inches in section, is constructed of 16-gage galvanized iron and insulated with 1½-inch thick blocks of 85 per cent magnesia, wired to Hyrib laths, and covered with ½-inch asbestos cement. By-pass ducts and dampers make it possible to use forced draft without first passing it through the preheater.

The main flues from two adjacent furnaces are connected with a common chimney flue and one chimney. The other two furnaces are likewise connected to the second chimney. Checkered baffle walls, of refractory brick, have been constructed in the exit port of the preheater chamber, the entrance port to the main flue and in the entrance to the chimney. These walls hold back the heat in the furnace and prevent fly ash from passing up the chimney, but do not restrict the gas flow sufficiently to cause a back-lash in the furnace. Clean-out doors 24 x 30 inches, protected with 2 inches of Superex insulation and 3 inches of Firecrete, are placed at the bottoms of the combustion and preheater chambers and in the main flue.

The two radial brick chimneys are 150 feet high and 9 feet inside diameter. The independent firebrick linings extend the full height, a ventilated air space of 3 inches clear being left between them and the radial brick shaft. In order to minimize the effects of expansion and prevent cracks, the linings are held together by steel corsets, which consist of horizontal bands and vertical stays of 3 x ¼-inch flat steel, spaced about 3 feet apart in both directions and securely bolted together. A target wall 4½ inches thick is constructed inside the lining for a height of 30 feet. It is entirely independent of the firebrick lining and is installed to take the destructive action of the hot gases entering the chimney and thus protect the self-supporting lining.

Base metal thermocouples, placed in the tops of the combustion chamber and preheated air duct of each furnace, are connected with indicating pyrometers in the stoking room and recording pyrometers in the operating office. One indicating pyrometer serves two furnaces, reading being controlled by two double throw switches. There is one recording pyrometer for each furnace, with a single chart ranging between 0 and 2,400 degrees Fahrenheit, upon which is recorded the combustion chamber and air temperature of the furnace to which it is connected.

An electric light signal system was installed on each furnace to coordinate the activities on the charging and stoking floors. A red light, mounted above each charging hopper and operated by a limit switch on the charging gate, shows the instant the gate below the light begins to

open, and remains lighted until the gate is again completely closed. A push-button station on each charging hopper operates a white light in front of each furnace cell. This permits the charger to indicate to the stoker that the charge has passed through the gate and that the gate should be closed, or to reopen the gate when an obstruction prevents it from being fully closed. A speaking tube located between each pair of furnaces furnishes a convenient means of conversation between charger and stoker.

The Test Run

After the plant was put in operation, a continuous test was run for 4 days and 16½ hours to determine whether it complied with the specifications. The specifications required that the charging and cleaning of the furnaces should be included in the period of the test and each furnace should be clean and clear of materials at the beginning and end of the test period. Owing to lack of sufficient garbage, only two furnaces were operated during the test, the total furnace hours being 225.25.

Weight of rubbish burned, 502.46 tons (moisture content of rubbish high, due to 48-hour rain during test period). Weight of garbage burned, 952.25 tons. Total refuse burned, 1,454.72 tons. Rate of burning per furnace hour, 6.46 tons. Guaranteed rate of burning, per furnace hour, 6.25 tons. Rate of burning per square foot of grate area per hour, during test, 71.8 pounds. Rate of burning per square foot of grate area per hour, guaranteed 70.0 pounds. Per cent of rubbish burned in mixture during test, 34.54 per cent, guaranteed not to exceed 35 per cent. Per cent of garbage burned in mixture during test, 65.46 per cent, guaranteed 65 per cent. The temperature in the combustion chambers was guaranteed not to fall below 1,200° for more than 10 minutes in any hour. High temperature, 2,180°; low, 1,160° for 7 minutes; average, 1,450°. Temperature of preheated forced draft, minimum 280°, maximum 580°; average, 420°. Density of smoke, not greater than Chart No. 1 of Ringelmann's Smoke Scale. The analysis of the ash residue was satisfactory.

A total of 589.88 tons of rubbish was delivered at the plant during the test. From this was separated 77.42 tons of incombustible materials, composed of 56.24 tons tin, 17.96 tons glass, 3.22 tons trees, brush and débris. After completion of the test 10 tons of rubbish was left on the pit. The test shows the plant to have a capacity of 620 tons in each 24 hours. During the test no fuel was used except the rubbish.

The plant was well built, there being complete cooperation between The Foreman Co.; the Bureau of Mechanical-Electrical Service, which had charge of the construction; The Charles L. Stockhausen Co., Inc., builder; and The Pittsburgh-Des Moines Steel Co., which designed and installed the furnaces. The paving of the drives and planting of grass and shrubbery around the plant has been deferred until the fill has settled.

The plant has been in successful operation since January 1, 1933. During January, February and March, 14,160 tons of rubbish was delivered to the plant, from which 850.0 tons of non-combustible materials was separated. The net amount of rubbish incinerated was 13,310 tons. The garbage delivered and incinerated during the same period was 14,782 tons. The total refuse burned was 28,092 tons.

The Collection System

Previous to the construction and operation of the garbage incinerator, while some of the garbage was collected and hauled by trucks with canvas covers, most of it was collected and hauled by horse-drawn carts, which delivered the garbage to several dumping stations, where it was transferred into trucks, and then hauled to scows for transportation by water to the garbage reduction plant.

In order to improve the garbage collection system from the sanitary and economical viewpoints, it was decided to eliminate the garbage dumping stations, and to substitute a modern sanitary covered truck for the carts and the old-style trucks.

As there was no body on the market that would meet all our requirements, the Chief Engineer's office designed a special body to be mounted on a standard chassis, not, however, to be over 7 feet wide, in order to make collection of the garbage possible in 10-foot alleys, which are quite numerous in Baltimore. The length of the body is 10 feet, 6 inches; width inside at front, 73 inches; width inside at rear, 76 inches. Height of sides inside, 28 inches; water-level capacity, 4.63 cubic yards. The solid metal cover, 16-gage steel, is semi-circular and has four curtain type doors consisting of interlocking, corrugated, galvanized steel section, 20-gage, with malleable iron end-locks and wear plates, which when raised roll around curtain rollers and run on channel tracks. The tailgate is hinged at top and equipped with rubber gaskets and manual lock, and is made watertight. In the upper center of the tailgate there is a hinged door 30 x 26 inches for loading in rear of truck when necessary. The loading height does not exceed 60 inches. The center of the floor of the body is raised to give room for hoist, longitudinal structural members and cross members where they pass over chassis frame.

The center raised portion of the body is not over 9 inches in depth and is made of No. 8 U.S.S. gage, copper bearing, sheet steel. The sides, floor, front and tailgate is of No. 10 U.S.S. gage, copper bearing, sheet steel. All structure members are designed to carry a load not less than 9,000 pounds in addition to the body weight.

The hoist is Trenton model j-c or Wood model F-2 C, hydraulic type, arranged for rear dumping of the body to an angle of not less than 55 degrees.

The bodies are painted with Dulux enamel, light gray in color, and present a neat appearance. Five trucks have been in service since January and have proved satisfactory. Fifteen more trucks have been ordered, and it is the intention as soon as funds are available to eliminate all horse-drawn vehicles and old-style trucks and substitute late model trucks with modern, sanitary bodies.

B. L. Crozier is Chief Engineer, and W. Rayner Straus Mechanical-Electrical Engineer, Department of Public Works.

GARBAGE COLLECTION TRUCK DUMPING INTO STORAGE BIN AT THE INCINERATOR

Surface Treatment of Topsoil Roads

By J. S. WILLIAMSON
Assistant to the State Highway Engineer, South Carolina State Highway Department,
and
PAUL F. CRITZ
Associate Highway Engineer, United States Bureau of Public Roads

BEGINNING in the summer of 1923, the South Carolina State Highway Department undertook to develop an inexpensive bituminous treatment for use on the better class of topsoil and sand-clay roads, included in the state system. It was hoped to provide an all-weather surface which would eliminate the dust nuisance and carry comparatively dense motor traffic without excessive maintenance, either for an indefinite period or, for certain roads, until such a time as funds might become available for providing a higher type of pavement.

A considerable mileage of topsoil and sand-clay roads had already been constructed which, under favorable conditions, were proving entirely adequate. However, on some roads, because of the amount of traffic or the character of the soil or both, it was impossible to provide a satisfactory riding surface free from objectionable dust, in spite of excessive maintenance. It was to design a surface for such roads that a study of bituminous treatment was carried on by the state in 1923 and 1924.

The first series of experimental surfaces was constructed in 1923 and embraced six short sections. Five of these were constructed by the penetration method, the sixth by surface treatment. The conclusions drawn from this group of experiments were that the penetration type was less practical than the thin mat type of surface treatment, and that the degree of success obtained with the latter was dependent upon the quality of its supporting base.

The second series, built during 1924, covered six sections surface-treated with heavy oils and tars as binding materials, with and without light oil and tar priming coats. The binding materials were applied at the rate of approximately a half-gallon, and the priming materials, when used, at about one-fourth gallon, per square yard. Within a year after construction almost half of the areas on which the priming coat had been omitted required scarifying and re-treating, as did approximately one-third the area of the section on which a light, asphaltic oil was used as a primer. The two sections on which a light tar prime coat was used apparently remained in better condition, as the percentage of failure recorded was much less.

In this early experimenting it was noted that some combinations of bituminous materials were satisfactory for some soil conditions but were not so satisfactory under other conditions. The form of treatment, however, gave such promising results in general that the Highway Department in cooperation with the Bureau of Public Roads constructed an experimental project to study the feasibility of surface-treating topsoil or sand-clay roads using various types and grades of bituminous materials.

Summary of Cooperative Project

This project, approximately 8 miles in length, was constructed in May and June, 1925, on United States Route 176, between the south limits of Inman and the North Carolina state line. The surface treatment consisted of a prime coat of one-quarter gallon per square yard, a second application of one-third gallon per square yard, and 45 pounds of cover material. Cut-back asphaltic oil and 8-13 viscosity (Engler) tar were used as primers. The materials used for second application were asphalt of 150-200 penetration and tar, both applied hot. One-fourth to one inch crushed granite was used as cover material on all sections except a part of section 9, on which ¼-inch chats were used, and parts of sections 9 and 10, on which ¼-1 inch slag was used.

Seal coats were applied to a portion of the experiment in November, 1925, and the remainder was sealed in March, 1926. The seal consisted of one-fifth gallon of bituminous material, and cover. The following materials were used on different sections and parts of sections: 18-25 viscosity tar, 8-13 viscosity tar, quick-drying asphaltic oil, and slow-drying asphaltic oil. Sand and ¼-⅝-inch crushed granite were used as cover.

Portions of sections 7, 8, 10, and 11 required re-treatment in 1928, and part of section 11 in 1929. In 1930 portions of sections 8 and 11 were given treatments for the purpose of providing a non-skid surface. Maintenance was continued until July, 1931, when the road was abandoned for a new location. The average costs for maintenance and re-treatments over the six-year period amounted to $324 per mile, or $270 per mile exclusive of the cost of non-skid treatments applied to sections 8 and 11. The initial cost of surface treatment, including seal, varied from 17.67 to 24.43 cents per square yard.

Two materials failed to prove satisfactory—the cutback asphaltic oil which was used as a primer, and the slow-drying asphaltic oil used in the seal treatment. The former was a combination of a heavy asphaltic base and a highly volatile distillate. Because of its high original viscosity, increased by the loss of distillate on application, there was little penetration. The slow-drying oil developed a surface that was slippery in wet weather, and its use has been largely discontinued in favor of tars and quick-drying asphalts.

At the termination of the project all the sections were in good condition and indicated that they would have continued to give excellent service. Average traffic on this road was in the neighborhood of 600 vehicles per day in 1924 prior to treatment, and about 950 in 1931.

The Cooperative Project

The cooperative project was built in May and June, 1925, on State Road 19, now designated as United States Route 176, between the south city limits of Inman and the North Carolina state line. It was approximately 8 miles in length and was divided into five sections. Bituminous treatment was applied over a width of 19 feet, except for a distance of 3,800 feet through the town of Inman, where its width was 25 feet. The project was maintained jointly by the state and the Bureau until July, 1931, when the road was abandoned for a new location and the construction of a high-type pavement. A record was kept of the cost and character of maintenance and of the service behavior of each section. The table gives the location, description, and maintenance cost of the various sections.

As previous experience had taught that the surface treatments remained more satisfactory on some types of soil than on others, a study of the topsoil and subgrade was made prior to applying the bituminous surfaces, in order to determine if possible the properties which a satisfactory soil base should possess. It was observed that on a major portion of each section the road surface

was smooth and well bonded but on the remaining areas it was rough, pot-holed, or in a loose condition. On that portion of section 11 between stations 729+00 and 791+25 the surface scaled badly during treatment work. This condition was caused, it was believed, by the finely crushed granite which had been spread over the surface to a depth of about 2 inches but which had not worked into the surfacing material and as a result was only partially bonded.

The depth of the old topsoil wearing surface varied throughout the sections, ranging from 4 to 8 inches. Samples of the topsoil surfacing and of the subgrade were analyzed.

The bituminous materials were selected with a view to forming a stable mat of bitumen and stone which would adhere to the topsoil surface. In the early experiments it had been found that a bituminous material sufficiently viscous to hold a stone cover did not adhere satisfactorily to an untreated surface and that a priming application was highly desirable. The materials used on this project for priming were fluid products designed to penetrate well and to dry rapidly to permit early application of the second coat.

Construction Procedure

The general procedure in constructing the bituminous surfaces was to sweep the topsoil surface clean of all loose and foreign material and then to apply about ¼-gallon per square yard of the selected priming material. Holes or breaks occurring in the topsoil surface were repaired after priming, ordinarily, by filling the depression with stone, but the case of very bad breaks a bituminous cold patch mixture was used. A considerable amount of such repair work was required on the north third, approximately, of section 11.

The prime coat was permitted to penetrate and set up for a day or two, after which a more viscous bituminous material was applied at the rate of about 1/3-gallon per square yard. The surface was immediately covered by hand with about 45 pounds per square yard of the mineral cover selected and then rolled, after which the section was opened to traffic. During the first two or three weeks following construction it was necessary to re-spread the cover material thrown to the sides by traffic over those areas where bleeding and picking-up indicated a deficiency of covering. Chats, which were waste concentrates from zinc mines and were mainly dolomite passing a ⅝-inch and retained on a No. 10 sieve, as well as slag and crushed granite, were used as cover materials on the location shown in the table.

During the fall and spring following construction all of the sections received a light re-treatment which served as a seal. The bituminous materials were of the same types as those used in the original construction but were less viscous. Sand was used as the cover material on all sections except a portion of section 10, on which crushed slag had been used originally, and two short lengths of section 11. On these portions ¾- to ¼-inch crushed granite was used.

These experiments illustrate rather strikingly the fact that under average conditions surface treatments can be applied at moderate cost which will give excellent service over a period of years. They also offer an interesting comparison of methods of treatment in vogue six years ago with those of the present time. Although traffic had increased over 50 per cent during the period of the experiment, its effect was not reflected in the cost of maintenance, which continued uniform. At the termination of the project the sections were all in good condition and

CONSTRUCTION DETAILS AND MAINTENANCE COSTS
ORIGINAL CONSTRUCTION

Section	Station	Area	Surface Treatment, May and June, 1925: Prime Coat (¼-Gallon per Square Yard)	Second Application (⅓-Gallon per Square Yard)	Cover (45 Pounds per Square Yard)	Seal: Date Applied	Stations Sealed	Bituminous Material (½-Gallon per Square Yard)	Cover	Cost per Square Yard
		Sq. yds.								*Cents*
7[1]	0+00 to 82+50	19,950	8-13 viscosity tar	Tar, hot	¼ in.-1 in. granite.	November, 1925	38+00-82+50	18-25 viscosity tar.	Sand	21.30
						March, 1926	0+00-38+00	8-13 viscosity tar.	do	
8	436 to 512	16,044	Cut-back asphaltic oil.	150-200 penetration asphalt, hot.	....do	....do	436-512	Quick-drying asphaltic oil.	....do	17.67
9	512 to 517	1,056	....do	Tar, hot	....do. chats.	....do	512-536	8-13 viscosity tar	....do	24.43
	517 to 533	3,378			¼ in.-1 in. slag.					
	533 to 536	633								
10	536 to 553	3,589	8-13 viscosity tar	....do	....do	November, 1925	574+50-622+50	18-25 viscosity tar.	....do	22.84
	553 to 622+50	14,672			¼ in.-1 in. granite.	March, 1926	536-553	8-13 viscosity tar.	¼ in.-¾ in. granite.	
							553-574+50		Sand	
11[2]	622+50 to 791+25	35,414	....do	150-200 penetration asphalt, hot	....do	November, 1925	622+50-720	Slow-drying asphaltic oil.	....do	18.04
							720-735		¼ in.-¾ in. granite.	
							735-750		Sand	
							750-780		¼ in.-¾ in. granite.	
							780-791+25		Sand	

MAINTENANCE AND RETREATMENT COSTS
[Cents per Square Yard]

Section	1925-26 Maintenance	1926-27 Maintenance	1927-28 Treatment	1927-28 Maintenance	1928-29 Treatment	1928-29 Maintenance	1929-30 Treatment	1929-30 Maintenance	1930-31 Treatment	1930-31 Maintenance	Total	Average Annual	Annual Surface Cost per Mile 20 Feet Wide
7	3.08	2.11	[3]0.99	1.30	....	1.22	....	1.57	....	1.33	11.60	1.93	$226
8	2.63	1.99	[3]1.39	1.20	....	1.51	[3][4]4.84	1.14	[3][5]3.96	.74	19.40	3.23	379
9	2.37	.78	....	.62	....	.97	....	.73	....	1.42	[3]10.60	[3]1.77	[3]208
10	4.00	2.07	[3]3.07	.69	....	1.33	....	1.64	....	.66	6.89	1.15	135
11	5.56	3.22	[3]1.31	2.01	[3]2.41	1.41	....	1.36	[3][5]5.86	.37	13.46	2.24	263
											23.51	3.92	463
Average	....	....	....	....	....	....	....	....	....	....	[3]17.65	[3]2.94	[3]345
											....	....	324
											....	....	[3]270

[1] Treatment was made 25 feet wide from station 0+00 to 38+00; remainder of project was 19 feet wide.
[2] Station equation; Sta. 721+00 = 722+00.
[3] Section treated in part only but cost is proportioned over entire section.
[4] Treatment applied mainly to provide a non-skid surface.
[5] Costs exclusive of non-skid treatment.

showed that their excellent service would have continued.

At the time the surface treatments were applied it was believed that a thoroughly bonded base was necessary, and it was thought that the ideal base would be one which, untreated, would remain stable and would not ravel under traffic. This idea indirectly implied the use of a natural binder, such as clay, to maintain the bond, the amount varying with the characteristics of the binder and with the moisture conditions encountered.

It is known that capillary moisture stabilizes the cohesionless sands and other granular materials required for satisfactory road surfacing and bases for surface treatment. In the untreated road the surface portion is deficient in moisture because of evaporation, with the result that a clay binder is required to bind or cement the particles of granular material into a stable and wear-resisting surface. In the surface-treated road evaporation is largely prevented and the moisture content of the soil is increased by capillary action, with the result that the bond is sufficient to furnish the required stability, not only in the top portion but throughout the depth of the base. Thus the need for clay binder is largely eliminated.

This does not mean that bond is not required in a base to be surface-treated. As a matter of fact, bond is required for stability in all types of soil roads, whether they serve as bases or as surfaces. Thus the necessity for having a bonded surface upon which to apply the treatment is still recognized, but ideas have changed as to the method of obtaining this condition.

The binding properties of clay reach a maximum value at a certain moisture content and decrease with further increase in moisture. Consequently, the increase in moisture content due to surface treatment may not only reduce the binding property of the clay but may soften it to such an extent as to cause loss of stability in the base, resulting in failure of the surface treatment.

The Bituminous Materials Used

The early unsatisfactory behavior of the north portion of section 11 could have been avoided by a more suitable priming treatment of the loosely bound top course. A greater amount of priming material, with light surface mixing, would have stabilized the base course to a greater depth than the light application of prime used, and would have largely eliminated the failures resulting from the displacement of the base materials.

The bituminous materials used in the original construction were, with two exceptions, of the same types that are used today for similar work. The two exceptions are the quick-drying asphaltic material used as a prime and the slow-drying material used in the seal treatment.

The asphaltic primer was a combination of a heavy asphaltic base and a highly volatile distillate and had a specific viscosity at 40°C. of 117, which was approximately ten times that of the tar prime. Because of its high original viscosity, which was proportionately increased by the loss of distillate upon an application, there was little penetration, and the heavy material remained on the surface as a mat. Had the prime been made up with a less volatile distillate and reduced to the consistency satisfactory for priming purposes, much better penetration would undoubtedly have resulted, without the deposition of heavy material on the surface.

The 8 to 13 viscosity tar used is still considered highly satisfactory as a priming material. Asphaltic primers also are used, and the type favored is a material of low viscosity composed of a base and distillate such as to insure penetration and the development of a residue after penetration which will harden and develop some cementing value. The residue is not required, however, to serve as a binder to hold a cover of gravel or stone chips.

The other material which did not prove satisfactory was the slow-drying asphaltic oil used in the seal treatment on section 11. This material, according to its analysis, showed a low loss at 163° C. and an apparently soft residue. In combination with the sand cover it developed a surface that was slippery in wet weather. Because of this tendency its use has been largely discontinued as a seal material in favor of tars or quick drying asphalts.

There has been a tendency in recent years to use for re-treatment cold surface-treatment material of viscosity higher than that of those formerly used. The greater viscosity produces stiffening qualities more nearly approach those of materials applied hot, while at the same time permitting more manipulation during construction for the purpose of improving the riding qualities.

Cold application materials, compared with those applied hot, seem to insure in greater degree and for a longer period of time the maintenance of a non-skid surface. The tar-treated sections in this experiment retained an excellent non-skid surface throughout the entire period, and did not require any treatment on this account.

Maintenance

The cost of maintaining the wearing surface of the project through the six-year period, while varying among the sections, is considerably less than that of an untreated topsoil carrying much less traffic. Data obtained in a survey of low-cost roads by C. N. Connor indicate that the corresponding maintenance cost of untreated topsoil and sand-clay roads averages between $300 and $600 per mile annually, and that such roads, ordinarily, serve economically and satisfactorily a maximum of about 400 vehicles daily, while heavier traffic increases costs.

Excluding the cost of the non-skid treatments, which, while they obviously added somewhat to the betterment of the areas affected, were applied principally as a safety factor, the maintenance ranged from $135 to $345 per mile annually and averaged $270. Including the non-skid treatment the average annual cost was $324 per mile. While this cost may be higher than present-day maintenance of similar type, it should be recalled that little preliminary work was done on the road prior to applying the surface treatments, and also that the project was made up of relatively short experimental sections. The crown, while satisfactory for the old sand-clay type, was excessive for a surface-treated road and is believed to have added somewhat to the cost of maintenance.

Traffic records show that in 1924 the road was carrying an average of 636 and a maximum of 800 vehicles daily based on a count through the summer months only. For the fiscal year 1930-31 a monthly count showed the sections to be carrying an average of 956 vehicles daily with a maximum of 1,402, which is an increase of over 50 per cent. The maintenance cost of the sections, with the exception of the first year after construction, which usually is relatively high, continued very uniform in spite of the great increase in traffic.

FORWARD STEPS

Reported by
Municipal Officials, Chamber of Commerce Executives, and Others

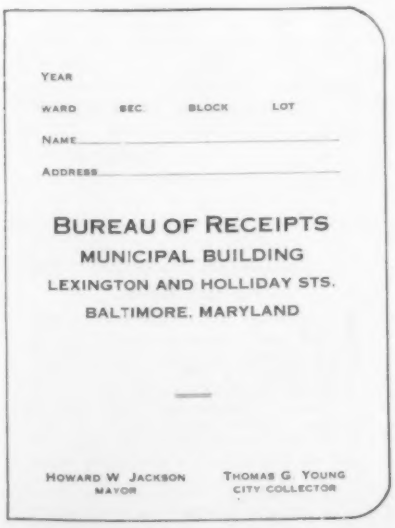
Baltimore's Tax Savings Plan

BALTIMORE, MD. — The unfortunate financial situation in which many municipalities find themselves is due, in most cases, to the wasteful spending of the people's money and the improper collection of taxes. Tax arrearages, if allowed to accumulate, will eventually destroy the credit and bankrupt any community.

Fine results have been obtained in Baltimore by the use of campaigns designed to educate the public to the advantages gained by the prompt payment of taxes, and I am convinced that this should be the policy of the Department rather than the old threatening strong-arm method. Of course, there should be no temporizing with those people who can pay but who will not.

The changed conditions of the last three years have made it difficult for many persons, who were formerly prompt with their tax payments, to get the full amount together at one time, and in order to help these deserving people, and at the same time keep funds coming in to meet the fixed charges of the city government, I have put into operation the Tax Savings Department of the Bureau of Receipts.

Taxes in Baltimore are due January 1 and become in arrears July 1 of the same year. Interest and penalty charges are added beginning August 1, and the Collector can sell the property at any time after the current taxes become in arrears. There is no provision in the charter of the city for installment payments. The problem was to find a way which would not interfere with the existing laws, and also to put the savings plan into immediate use and to avoid the delay that would be caused if legislative authority was requested.


YEAR

WARD SEC. BLOCK LOT

NAME

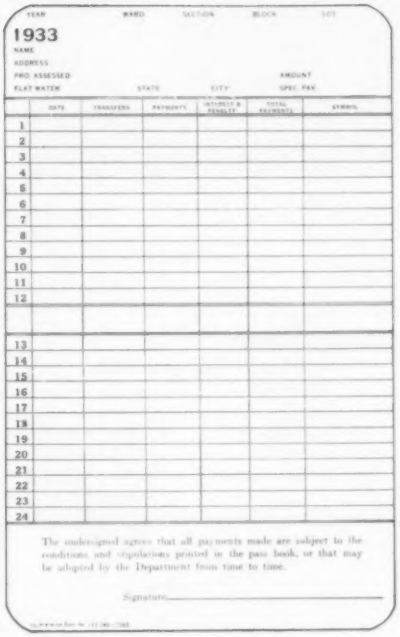
ADDRESS

BUREAU OF RECEIPTS
MUNICIPAL BUILDING
LEXINGTON AND HOLLIDAY STS.
BALTIMORE, MARYLAND

HOWARD W. JACKSON
MAYOR

THOMAS G. YOUNG
CITY COLLECTOR

COVER OF THE PASS-BOOK


YEAR WARD SECTION BLOCK LOT

1933

NAME

ADDRESS

PRO ASSESSED AMOUNT

FLAT WATER STATE CITY SPEC. PAV.

	DATE	TRANSFERS	PAYMENTS	INTEREST & PENALTY	TOTAL PAYMENTS	SYMBOL
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						

The undersigned agrees that all payments made are subject to the conditions and stipulations printed in the pass book, or that may be adopted by the Department from time to time.

Signature

THE LEDGER CARD

There is no red tape to the tax savings plan. It is an arrangement between the taxpayer and the City Collector whereby a person may accumulate tax money by depositing small sums with the Collector. The taxpayer presents the bill he wants to pay to the cashier of the Savings Department; the information is taken from the bill, and whatever amount he wants to deposit is entered on the office record and in a pass-book; the pass-book is the same as that used by savings banks and is given to the taxpayer.

Deposits may be made at any time and in any amount from $1 up. When one-half of the total tax has been accumulated, it is transferred from the Savings Department to the general ledgers, thus reducing the amount on which interest and penalty would be charged, or, if it is transferred during the discount period, the taxpayer is given the benefit of the discount on the amount transferred.

The rules and regulations, printed in the pass-book, are in part, as follows:

All payments of money made by the taxpayer shall immediately become the property of the city of Baltimore, and the taxpayer shall in no event be entitled to a refund thereof.

The acceptance by the Bureau of Receipts of the payments credited to the taxpayer in this book shall not be construed as a waiver of interest and penalty by the city of Baltimore.

The City Collector may, at his option, credit any part or all of the balance, credited in this book to the account of the taxpayer, to the balance then remaining due by the taxpayer on account of the taxes and water rent assessed against the property or other charges for which this account was opened.

In the event the taxpayer for whom this account was originally opened sells the particular property, the City Collector (provided he has knowledge of the sale) may in his sole discretion immediately credit the amount of payments already received to the balance then remaining due on account of the taxes, water rent and special paving against the particular property, or any other charge for which the account was originally opened.

Whenever the total amount of payments made by the taxpayer shall equal the total amount due as taxes and water rent, plus interest and penalty, or the total amount of any other charges assessed against the particular property for which the account was opened, then, and in that event, this account shall automatically be closed.

In the event this book shall be lost or stolen, the taxpayer may procure a new book in which the total amount of payments, as appears from the records of the Bureau of Receipts, will be entered upon the furnishing by the taxpayer of an affidavit stating that this book has been lost or stolen.

Checks are received only as a convenience to the taxpayer, or to the person in whose name this account is opened, and credit to the account will not be final until the check has been paid to the Bureau of Receipts by the bank on which it has been drawn. The Department assumes no responsibility for any delays that may occur between the time the check is received by the Bureau of Receipts and its presentation to the bank on which it is drawn for payment.

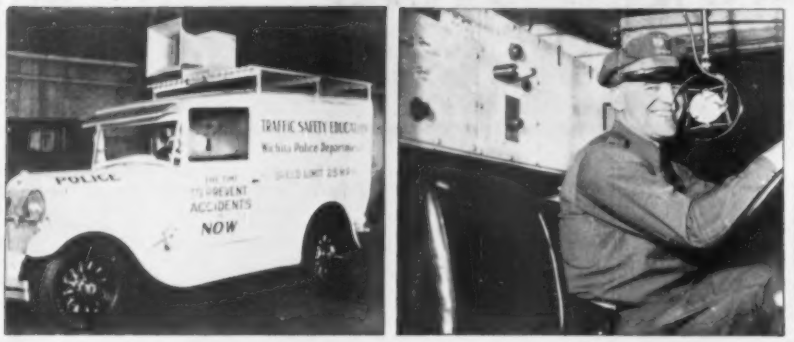
From the results obtained and the expressions of approval received, I feel sure that the plan will be a success.

THOMAS G. YOUNG,
Collector.

Police Department Uses Mobile Public Address System in Traffic Education Work

WICHITA, KANS.—To call the attention of a driver to a traffic violation while he is making the error is certainly more educational than mere punishment—provided there is no wilfulness in the error. The use of a mobile public address system for this purpose was originated in Wichita by Lieutenant Ray Ashworth, in charge of the traffic detail of the Wichita Police Department.

The public address system was first used as a stationary unit at the various downtown intersections to educate pedestrians in the observance of the traffic signals. It was found very satisfactory at these locations in instructing drivers about the proper turning movements and the proper lanes, and in cautioning them against running on amber lights. As a result of this success, Lieutenant Ashworth conceived the idea of mounting the system on a truck and using it in regular patrol work. All the controls of the speaker system are mounted on a panel just at the rear of the driver, and the microphone is suspended near his head, so that one man can drive the truck, operate the speaker system, and direct traffic.



THE WICHITA LOUDSPEAKER TRAFFIC PATROL CAR, AND ITS DRIVER AT THE MICROPHONE

It has been found that an officer using this patrol truck during an eight-hour tour of duty is able, on an average, to make contact with one violator every three minutes—which is more than an officer on foot or on a motorcycle or in an ordinary automobile could do. These contacts have the value not only of calling the offender's attention to his violation, but also of reminding all other persons within earshot that a rule of safety exists. By patrolling residential sections it is possible to inform children that playing in the streets is dangerous, and to bring parents to the door to listen to the explanation.

The device is a perfect means of informing a driver that his taillight or headlights are out. One officer in the public address truck can do the work of many motorcycle officers in this respect. The system is used for calling attention to practically every type of violation; running on stop signs, speeding, improper turns, defective lights, failure to signal properly, are the more common ones. It has been effective in handling the careless delivery man who parks his truck in the middle of the street, with ample space at the curb; an instruction from the operator of the public address system results in an immediate correction of the parking. If the delivery man is in a store, the loudspeaker calls him immediately to park his truck properly. It is more valuable than several officers in clearing a point of congestion, and would undoubtedly prove effective in controlling a riot or a mob.

The rear of the truck carries the sign: We Are Doing All That We Can to Prevent Accidents—We Need Your Help. The public reaction to the use of the system has been very gratifying. Most careful instructions are given to the operator to avoid the possibility of creating public disfavor. Wisecracking, the use of poor grammar, and gruffness in the voice of the operator, are strictly prohibited. "Please" and "Thank You" are frequently used. This equipment has been more effective in calling the attention of the general public to our safety activity than any other single thing we have done in our work for public safety.

O. W. WILSON,
Chief of Police.

A Park Planned from a Dump in Dixon Along the Rock River

DIXON, ILL.—This city stands high in the possession of public park lands—an acre for every 33 inhabitants. Last fall Dixon completed a river-front park improvement which amounts to the rescue of a valuable possibility, recognized as such by the late O. C. Simonds, a landscape architect, of Chicago, who visualized the transformation shown in the accompanying photographs.

The former dumping ground—about six acres, four blocks long—was overflowed each spring by the flood waters of the Rock River. Nearby stood a beautiful high school building, built a few years ago, at a cost of $700,000, on low bottomland which had been raised by pumping gravel from the river. With the exception of a fine athletic field adjoining the building, the surrounding land had been left in a condition most unsuitable for a school setting. A special assessment ordinance was passed by the City Council, and the work of transformation was done in less than a year.

The total cost of the improvement was $18,000. Of this sum, $12,745 was assessed against the city as a public benefit, the remainder against private property owners and the Board of Education. A small portion of the land being condemned,* it was possible to divide the expense to the municipality into twenty annual payments: $1,271.24 for each of the first two years, and eighteen annual payments of $565.14 each.

* The Illinois law provides that in order to divide public improvement payments into twenty parts, or covering twenty years, there must be land condemnation proceedings therewith, otherwise payments can cover only ten years.

DIXON'S FORMER RIVER-FRONT DUMP

This park connects with other river-front improvements extending for twelve city blocks, and the walk along the water's edge runs this distance without crossing an intersecting street, passing under the ends of the two bridges crossing the river. In the center of the park stands the statue representing Abraham Lincoln as he appeared when stationed at Dixon as a soldier in the Black Hawk War in 1832—the work of Leonard Crunelle, a Chicago sculptor; it was erected by the state of Illinois in 1930.

The asphalt tennis courts in the new park are proving popular. There are numerous walks, and an inner and an outer asphalt drive. A picturesque lagoon is one of the attractive features that have replaced a wilderness of underbrush.

The City Council which approved the appropriation for the park and cooperated with the Park Board in carrying out the project consisted of Mayor George C. Dixon and Commissioners H. A. Brooks, George Campbell, John Loftus, and Herbert Nichols. The Park

IN DIXON'S NEW PARK

Board members in charge of construction were, in addition to the President, Edward Vaile, Vice-President; Esther M. Barton, Treasurer; E. B. Raymond, Secretary; and William Hoberg.

LOUIS PITCHER,
President, Dixon Park Board.

Eliminate Weeds When You Clean Up the Block

IN the battle against hay fever, a most determined offensive should be directed against ragweed, the pollen of which is shed in great quantities during the month of August, causing the majority of cases of the disease. Early in the growing season the destruction of this weed should be attended to, in vacant lots and on roadsides. In a warning issued by the U. S. Department of Agriculture, the dwarf and giant ragweeds—two of the more common varieties—are described so that they may be easily recognized.

THE CITY'S LEGAL RIGHTS AND DUTIES

Conducted by A. L. H. STREET, Attorney at Law

Accidents

Pedestrian slipping on freshly painted traffic mark held without right of action against city (California District Court of Appeal: *Watson v. City of Alameda*, 13 Pac. 2d, 993).

Town held not exempted from liability for death resulting when automobile ran off unguarded highway embankment because driver was unlicensed (New Hampshire Supreme Court: *Vidal v. Town of Errol*, 162 Atl. 232).

Business Regulations

City Clerk held not subject to compulsory issuance of permit for erection of dental sign forbidden by state board rules (New York Court of Appeals: *Dr. Bloom, Dentist, Inc., v. Cruise*, 182 N. E. 16).

Ordinance forbidding automatic coin-in-slot gasoline pumps held valid as promoting fire protection, owing to absence of attendants (Nebraska Supreme Court: *Hawkins v. City of Red Cloud*, 243 N. W. 431).

Civil Service

Charter held to permit removal of policemen without notice or hearing (California District Court of Appeal: *Coffey v. Way*, 14 Pac. 2d, 143).

Condemnation Proceedings

Owner of business leasehold condemned for street widening held to have failed to prove damage claim (Wisconsin Supreme Court: *Fiorini v. City of Kenosha*, 243 N. W. 761).

Contracts

On defective construction of sidewalks, contractor held entitled to contract price less cost of correcting defects (Louisiana Supreme Court: *State v. Town of Plaquemine*, 143 So. 7).

City held not bound to award contract to lowest bidder in absence of statutory requirement (New York Supreme Court, Chemung County: *Connelly v. City of Elmira*, 258 N. Y. S. 603).

Contract to purchase fire-alarm boxes held not invalidated by failure to adopt specifications as a basis for bidding (Ohio Court of Appeals, *Patterson v. City of Zanesville*, 182 N. E. 352).

Council Tie-Votes

Mayor held empowered to break council's tie-vote on confirmation of his appointee (Montana Supreme Court: *State v. Loud*, 14 Pac. 2d. 432).

Depositories

City held to have preferred claim against assets of insolvent bank in which unbonded treasurer deposited funds (Springfield, Mo., Court of Appeals: *City of Doniphan v. Cantly*, 52 S. W. 2d, 417). But mere character as public money does not give preference rights as to funds lawfully deposited (Springfield, Mo., Court of Appeals: *City of Aurora v. Bank of Aurora*, 52 S. W. 2d, 496). To same general effect see *Union Banking Co. v. City of Douglas*, 165 S. E. 54, decided by Georgia Supreme Court.

Elections

Municipal election held properly held same time as general election and not vitiated on ground of lack of notice (Nebraska Supreme Court: *State v. Nebraska City*, 243 N. W. 858).

Licenses

License ordinance governing busses held inapplicable to interurban sightseeing busses (Colorado Supreme Court: *Canon City v. Kauffman*, 12 Pac. 2d, 1114).

Ordinance requiring license to amplify radio or phonograph sounds into streets, etc., held not broadly enough worded to include amplification from motor vehicles (New York City Court of Special Sessions: *People v. Weisblatt*, 258 N. Y. S. 687).

Club operating bowling alleys open to public held subject to license fee and regulation (Nebraska Supreme Court: *State v. Friend Recreation Club*, 243 N. W. 876).

Official Appointments

Statute limiting right of outgoing municipal commissioners to make appointments upheld (New Jersey Supreme Court: *Abbott v. Donohue*, 162 Atl. 197).

Official Bonds

City clerk's bond held to render surety liable for extra compensation illegally received by clerk (Nebraska Supreme Court: *City of Scottsbluff v. Southern Surety Co.*, 246 N. W. 346).

Official Tenure

City engineer held to have continued in office through Council's refusal to confirm appointment of successor (Montana Supreme Court: *State v. Rogers*, 18 Pac. 2d, 617).

Park Boards

Statute for park board in certain cities upheld (Iowa Supreme Court: *State v. Darling*, 246 N. W. 390).

Pensions

Policeman held to have forfeited pension right by dismissal from force for misconduct while pension proceeding was pending (Georgia Supreme Court: *Holcomb v. Smith*, 165 S. E. 581).

Sewers

State held empowered to compel city to establish sewage disposal system (Ohio Supreme Court: *State v. City of Van Wert*, 184 N. E. 12).

City held subject to injunction against discontinuing sewer service to milk plant (Texas Court of Civil Appeals: *Texas Milk Products Co. v. City of Mt. Pleasant*, 55 S. W. 2d, 1101).

Street Grades

Lot owner held not entitled to damages for regrading a street on which her lot did not abut (Pennsylvania Superior Court: *Cox v. City of Philadelphia*, 164 Atl. 95).

Streets and Alleys

Public rights in land dedicated as streets, etc., held not lost through delay in assertion of private occupancy (California District Court of Appeal: *Gross v. City of San Diego*, 13 Pac. 2d, 820).

Abutter held reinvested with title to land discontinued as street despite the existence of remaining underground public utility structures (Wisconsin Supreme Court: *Miller Investment Co. v. City of Milwaukee*, 244 N. W. 753).

Street Vacation

City upheld in closing portion of street as part of railway station project (Texas Commission of Appeals: *Kahn v. City of Houston*, 48 *S.W.*2d. 595).

Taxation

Exemption from taxation of allowances by Federal Government to war veterans held to follow investment in realty (Georgia Supreme Court: *City of Atlanta v. Stokes*, 165 S. E. 270).

Statute limiting tax levy held inapplicable as to pre-existing obligations (West Virginia Supreme Court of Appeals: *Fannin v. Board of Education of Barboursville*, 165 S. E. 542).

Traffic Regulations

Legislature's right to limit character of vehicles and loads on roads and bridges upheld (Mississippi Supreme Court: *Hudson v. Stuart*, 145 So. 611).

Transportation

Chicago ordinance requiring certificate of necessity for operation of taxicabs, showing of financial condition, etc., upheld (United States District Court, Northern District of Illinois: *Capitol Taxicab Co. v. Cermak*, 60 Fed. 2d, 608).

Taxicab license held revocable for fraud in obtaining it (North Dakota Supreme Court: *Martin v. Morris*, 243 N. W. 747).

Ordinance fixing minimum taxicab fares upheld (Texas Court of Civil Appeals: *Parsons v. City of Galveston*, 53 S. W. 2d, 160).

TRAFFIC CONTROL AND FACILITATION

Conducted by Publications Committee, Institute of Traffic Engineers, 175 Fifth Ave., New York

Maxwell Halsey, Chairman, Harry Hemmings, Reyburn Hoffman, Benoit Laberge, Theodore T. McCroskey, Donald M. McNeil, A. J. Naquin, Hawley S. Simpson, Arthur G. Sraets, Peter J. Stupka, Lawrence S. Tuttle, John C. Wrighton

What the National Traffic Safety Contest Revealed About Enforcement

By **EARL J. REEDER**
Traffic Engineer,
National Safety Council

THE importance of good traffic law enforcement has often been emphasized. Few have doubted its value. But the National Traffic Safety Contest for 1932 and the National Traffic Law Enforcement Demonstration, conducted among 56 cities last September by the National Safety Council's Street and Highway Traffic Section, gave the first comprehensive picture of its extent among the cities that are leading in traffic administration.

Some of the valuable lessons to be learned from the reports of the Contest are here reviewed. They show how cities are recognizing the special character of the traffic law enforcement problem and are adapting well-established police methods to the needs of an accident menace that rivals crime in the extent of losses in life, limb, and property. They are recognizing that good traffic planning and good traffic educational activities may be rendered quite ineffective unless they are backed up by proper enforcement of traffic regulations against those who are unwilling to conform and obey voluntarily.

Arrests Should Result in a High Percentage of Convictions for Traffic Violations

Traffic convictions are the end result of traffic arrests. A large number of arrests with but few convictions indicates either that arrests have not been properly made and the resulting charges will not stand in court, or that the courts are not supporting the police activities. The Contest reports gave data for comparing the number of convictions with the number of arrests and summonses for traffic violations in 101 cities. This comparison showed an average of 70 per cent of convictions, but by groups the small cities had better records than the large ones. In the group including cities of more than 500,000 population, 11 cities averaged 65 per cent, while in the group under 10,000 population 14 cities that reported enough data for compilation averaged 92 per cent. Several cities in the three groups under 50,000 population reported a conviction for every traffic arrest, and even in the group of largest cities, one city reported 98 per cent convictions. It is apparent that while the averages are lower in the groups of larger municipalities, a city of any size can obtain a high standard of traffic law enforcement.

Obsolete Ordinances Should Be Modernized

No city can do a very satisfactory job of enforcement if its ordinance is obsolete. Hence, each city in the Contest was asked to send a copy of its ordinance for rating on the extent of its conformance with the Model Municipal Traffic Ordinance recommended by the National Conference on Street and Highway Safety. The ratings were based on the provisions that are considered necessary for adequate accident prevention.

Among the two groups above 250,000 population, the 19 cities that submitted ordinances showed about 45 per cent conformance with the Model. Among the smaller cities, the average degree of conformance was lower, bringing the average for the 68 cities that submitted ordinances to about 20 per cent. Though this figure is low, it shows considerable progress by the National Conference on Street and Highway Safety and its cooperating bodies, in promoting uniform legislation among cities, particularly on those features that are related to traffic safety. Several cities, not included in this compilation because they did not submit copies of their ordinances, nevertheless reported a high degree of conformance with the Model. While some cities did not have printed copies of their ordinances, or even digests for general distribution, several cities submitted both. The city that distributes among its drivers a booklet outlining the traffic ordinance is doing a valuable educational job as the basis for successful enforcement.

All Police Departments Should Have Traffic Divisions

One of the important revelations of the Contest reports was the extent of the organization of traffic divisions of police departments. Even in the smallest population groups, many cities reported separate traffic divisions. In the larger cities they are highly organized. Kansas City and Boston presented departures from this plan, however. The former city requires all police officers to give attention to traffic, leaving the responsibility for traffic in different sections of the city in the police precinct officials, instead of concentrating it in a central division. A somewhat similar plan is being followed in Boston, where there is a small central traffic division and a decentralized responsibility for traffic administration in other districts. The Committee on Traffic Law Enforcement of the National Safety Council's Street and Highway Traffic Section recommends a distinct traffic division in every police department, with other officials instructed to give attention to traffic supervision and traffic violations in the course of their general police activities.

Police officials often ask, "How does our traffic force compare in size with those of other cities?" Of course there are many factors that must be taken into account in detailed comparison, but reports from 115 cities show that among the seven population size groups the average number of traffic officers per 10,000 population is practically constant—approximately 2. Eastern cities, generally, ran higher than those of other parts of the country, as might be expected because of the larger metropolitan areas and, in some cases, more difficult traffic problems to handle because of their older street layout and narrower streets. In "Traffic Work of Police Departments," published by the National Safety Council in 1928, a normal of approximately 3 officers per 10,000 population was reported, but that included the full-time equivalent of all traffic activities of police departments, such as part-time and civilian activities, while the Contest reports generally included only full-time traffic officers and the traffic duties which they generally perform.

Training of Competent Traffic Officers

The training of traffic officers is receiving special attention in many cities. Some have well-established police training schools with special courses for traffic officers. Some concentrate the training in a short period at the beginning of the traffic work of each officer, while others require a specified amount of class work each week, or otherwise distributed through the year. Baltimore has eight weeks of training before an officer enters the traffic division, and officers are then required to attend periodical assembly meetings. Boston, on the other hand, requires one hour in police school each week. Detroit has twelve classroom sessions of two hours each per year. Evanston has weekly instruction in police school, and monthly meetings for traffic officers. These cities are charac-

teristic of the different types of training that is given. In some of the smaller cities that are not large enough to maintain special police schools, training for traffic officers is obtained from the state police. Several states are specially equipped to give such training, and their facilities make it desirable for cities to take advantage of such instruction rather than attempting to run individual schools. Such a plan also promotes uniformity in the training of officers among cities in the same state. With the rapid growth that has taken place in state police organizations within the last few years, the opportunities for this method of training are now open to many cities.

Accident Investigations Further the Securing of Convictions

Accident investigations for conviction of traffic law violators were reported by 59 cities. The growth of this relatively new traffic law enforcement activity was one of the most surprising revelations of the Contest reports. As an index of the extent of accident investigation in different cities, the number of convictions for violations involved in traffic accidents, as the result of investigations, was related to the number of personal injuries reported. The latter figure was used instead of the total number of accidents or the number of deaths, because it is subject to less fluctuation among cities of different sizes and of different degrees of reporting. The average index for the 59 cities was 10 such convictions per 100 personal injuries (not personal injury accidents). But several cities had indexes that were many times this average, and Evanston, where the plan has been in operation for three years and has been highly developed, had approximately 100 convictions per 100 personal injuries.

Los Angeles' Depression Traffic School

THE world depression has brought about a large number of difficult problems, not the least of which is that of enforcing traffic regulations. Los Angeles has its quota of unemployment, as well as a large number of men, many with families, who are able to get only part-time work, at correspondingly low wages. Traffic courts in the city have been cognizant of the situation, but until March 1 of this year, the only tangible result was a decreasing number of citations, an increasing number of suspended sentences, and a badly crippled traffic fines fund.

Judge William R. McKay, Presiding Municipal Judge, assigned to Traffic Courts, has found what appears to be an "out," which while still leaving the revenues from fines and forfeitures in a depleted state, has the advantage of developing a growing group of cautious and law-abiding drivers.

"Four to five hundred cases are handled by the Traffic Courts each day," says Judge McKay. "Some of the defendants are palpably unable to pay a fine of any amount, or if able to pay, the loss of the money will mean serious privations to the defendants dependents. To sentence such a defendant to jail will terminate such small income as the family may possess, and to suspend his driver's license may either result in his losing his job or cripple his efforts to look for work." As an answer to this problem, Judge McKay decided to require all defendants whose circumstances made such action advisable, to study for and pass a thorough examination on the California Vehicle Act.

The way the plan works out is this: When a defendant pleads guilty, but states he is unable to pay a fine, the Court requests him to wait in the court room until the calendar is completed. After questioning, at the conclusion of the session, he is given a copy of the Act, and his case is continued until the following Saturday morning or Wednesday evening as the case may be. The defendant is told that the examination will be a complete one, and that if he fails, he may be required to serve his sentence in jail.

The examination is then held later at scheduled time. George Howard, Probation Officer, is in charge of the classes. After carefully calling the roll, he asks questions of individuals on various phases of traffic law, stressing driving rules, licenses and registrations. General discussions are held on such points as may develop, until it is certain that all in the class understand. The examinations last for two hours or more.

At the conclusion of the test, the examiner recommends to the Court the names of those who have shown a disposition to assimilate the traffic laws. The Court then suspends sentence of these defendants. Those who fail to pass but show an inclination to study usually are given the opportunity of attending a later examination. Bench warrants are issued for any defendants who fail to appear without sufficient excuse.

The Saturday morning class is attended by 100 or more violators, and the Wednesday evening class has an attendance of from 50 to 75 persons. Since March 1, more than 2,000 persons have taken the examination. Of these, not one has since been cited as a "repeater." This record is all the more remarkable in view of the fact that there will be a score or more repeaters among the same number of defendants who have been fined or imprisoned.

Traffic officers, who may have been hesitant about citing a driver after hearing a hard luck story, are now able to enforce the law uniformly, with the knowledge that the Court will take cognizance of the economic conditions of the defendants.

Judge McKay states that, despite the state examination given before a driver's license is issued, the ignorance of traffic law is often appalling. Many drivers have only a superficial idea of the provision of the Vehicle Act.

The traffic school is turning out informed drivers at the rate of approximately 7,500 a year. With these drivers showing a greater understanding of traffic law, and the reasons why each individual should abide by it, it is reasonable to assume that there will be a very appreciable decrease in the usual road hazards within the city.

REPORTED BY R. T. DORSEY,
Traffic Engineer, Los Angeles, Calif.

Rochester Engineering Society Traffic Survey

THE report of the Seventh Annual Traffic Survey of Rochester, N. Y., has just been published by the Rochester Engineering Society. It follows somewhat the lines of the six preceding surveys, with the addition of a 24-hour traffic count, a speed test, observations of lane observance, turning movements and hand signals.

It was found that 55 per cent of the drivers made no signal to warn the following traffic that they were about to turn left. Six per cent of the left-turning vehicles did not approach the intersection in the lane nearest the center of the street, and three per cent of the right-hand turning vehicles did not approach in the lane nearest the curb.

In the lane test it was found that eight per cent of the vehicles drove in the curb lane, sixteen per cent in the center lane, one per cent on the wrong side of the highway, and seventy-five per cent straddled two lanes. These tests were made on a 40-foot pavement on which there were no parked cars within two blocks in both directions. Cars driving in the center lane were not recorded when another car moving in the same direction was occupying the curb lane.

News of Traffic Engineering

THE Institute of Traffic Engineers has started the third volume of the *Traffic Digest* by issuing it in pamphlet form. Former issues of the Digest have been on mimeograph sheets which were rather bulky for filing purposes. It is hoped that the new form will prove more attractive and convenient.

The *Traffic Digest* is issued monthly by the Library Committee of the Institute, which endeavors to review all current items of interest in the field of traffic engineering. A brief review of each of these items is included. The Digest is furnished free of charge to members of the Institute and is available to non-members, libraries, etc., at the price of 25 cents per issue, or $2.00 a year. Copies may be obtained from the Secretary of the Institute, Hawley S. Simpson, American Transit Association, 292 Madison Avenue, New York.

Coincident with the change of the form of the *Digest*, the Institute started a monthly *News Letter* to members.

Correspondence from municipal officials concerning projects consummated in their localities which may be of interest to others charged with the control and regulation of traffic in urban or rural areas, is solicited by the Publications Committee of the Institute of Traffic Engineers. The Committee will endeavor to publish letters of such character in this section of The American City, in so far as space available will permit.

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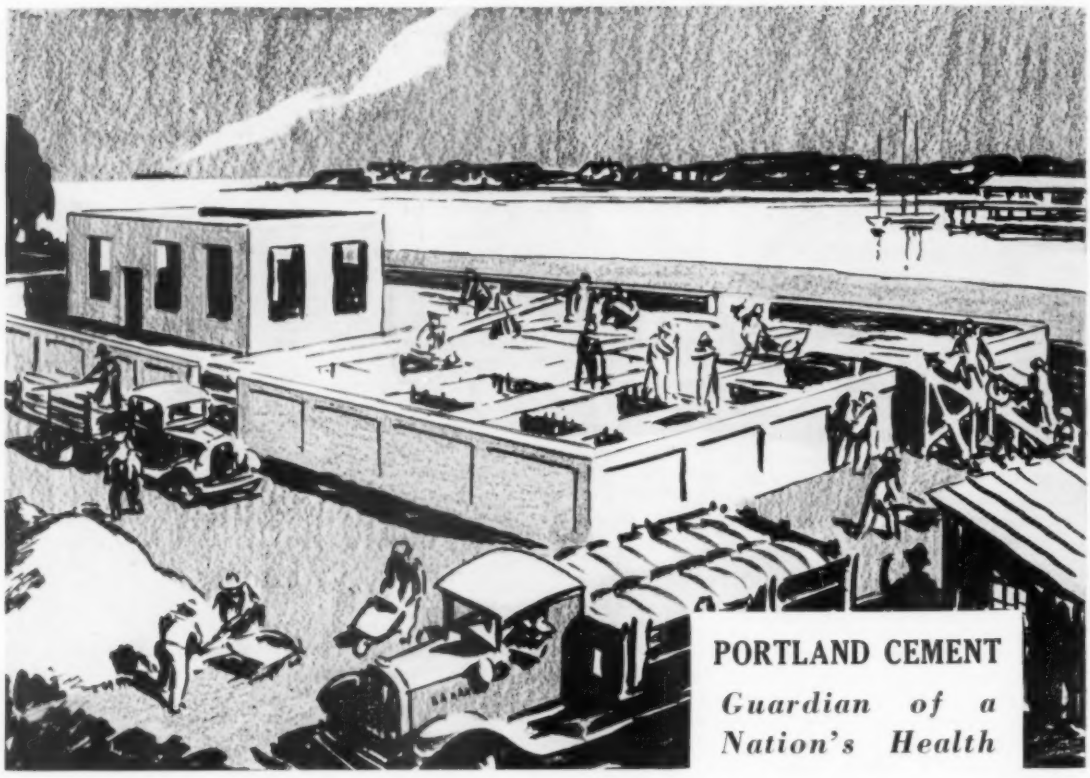

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Prepared by
City Planning and Zoning"
FRANK B. WILLIAMS
Author of "The Law of

ZONING and PLANNING NOTES

From Data collected
by the Zoning Committee
of New York
(233 Broadway)

Garage

ALABAMA.—*Leary v. Adams*, 147 So. 391 (Supreme Court, March 23, 1933).—The petitioner seeks to locate a filling station in a B-1-Residence zoning district, in which not only one-family residences, but two-family and multiple dwellings, hotels or apartments, hospitals, fraternity or sorority houses or dormitories, club-houses, public or semi-public institutions, educational or charitable, lodging or boarding houses, electric substations without rotary machinery, gas regulative stations, and accessories to these uses, were permitted, but filling stations were excluded. The building inspector declined to issue the permit; the zoning board of adjustment sustained the building inspector, and the applicant appealed to the courts.

This Court holds that the filling station was properly excluded from the B-1 district. While the permitted uses in that district are somewhat more extensive than those in the A-1 district, the character of the former as a residence district is preserved. A filling station in a residence district is not a nuisance per se, but may be a nuisance there from the way in which it is conducted, surrounding circumstances, etc. But the exclusion in this case is not on the basis of nuisance; the provision is valid, under the police power, and bears a rational relation to the health and safety of the community, as a part of the general comprehensive scheme of excluding trades and industries from residential districts.

Undertaking Establishments

INDIANA.—*Albright v. Crim*, 185 N. E. 304 (Appellate Court, in Banc, April 19, 1933).—The greater weight of authority in this county, and in the opinion of this Court, the correct view, is that an undertaking establishment in a residential section (even if not zoned as residential) is a nuisance.

This is the first case so to decide in the state of Indiana.

Boards of Zoning Appeals—Variance for Practical Difficulty and Unnecessary Hardship —Transitional Zoning

MARYLAND.—*Lugar v. North Baltimore Methodist Protestant Church*, 165 Atl. 703 (Court of Appeals, April 5, 1933).—Sarah Lugar, the tenant of a lot of land in a residential use district with a residence on it in the city of Baltimore, applied to the head of the Bureau of Buildings of the city for permission to convert the building into a confectionery and delicatessen store. He is a ministerial officer, without any discretionary right to vary the ordinance, and therefore refused to grant the application. The applicant then appealed to the Board of Zoning Appeals of the city.

The property was within 100 feet of a boundary line between two use districts. The Board of Zoning Appeals is given the right by the zoning ordinance in its discretion in a specific case to vary the terms of the zoning ordinance in certain particulars, in harmony with its general purpose and intent, when there are practical difficulties or unnecessary hardships in the way of carrying out the strict letter of any of its provisions. The Board of Zoning Appeals varied the ordinance, allowing the applicant to change the residence into a confectionery and delicatessen store. The North Baltimore Methodist Protestant Church, and ninety-nine others, appealed to the Baltimore City Court, which decided in their favor. From the decision of the City Court the applicant appealed to this Court.

This Court decides that the statutes of the state do not give any right to appeal from the City Court to this Court in such cases, thus leaving the decision in the City Court, against the applicant, and against varying the zoning ordinance, in force. On account of its importance, the Court goes on to decide that the provision in the ordinance giving the Board of Zoning Appeals the right to vary the strict letter of the zoning ordinance to give a remedy in cases where there are practical difficulties or unnecessary hardship in its literal enforcement is contrary to the constitution of the state of Maryland, and void. It admits that similar provisions have been upheld in many states in this country, but declines to decide in conformity with these decisions. The Court stated that it is a universal rule of law that a grant of discretionary power to an administrative body must be accompanied by provisions laying down a sufficient rule to guide it in the use of such discretion; and holds, contrary to the decisions of the states above referred to, that the provisions with regard to unnecessary hardships or practical difficulties are not such a rule, but are too vague and indefinite for the purpose.

EDITOR'S NOTE.—It is a principle of our constitutional law that the state may delegate to local legislatures both legislative and administrative duties; but with this exception a legislature, state or local, may not delegate the right to make laws but only the right to put them into effect. Legislatures often create administrative bodies to carry out a law or an ordinance. Boards of appeals, created to administer certain details of the state zoning law and the municipal zoning ordinance, are such bodies. The power of these boards to vary the zoning ordinance in cases of practical difficulty or unnecessary hardship is such a detail.

In the execution of this power the board of appeals is necessarily given a certain amount of discretion. Evidently under the guise of discretion the board cannot be given power so broad as to enable it to fix policies, for this would in effect be to pass laws. Its power must be limited to carrying out policies fixed by the legislative body itself, in the law or ordinance or elsewhere. In other words, a legislative grant of discretionary power must be accompanied by a sufficient rule to guide discretion to be exercised under it.

The rule accompanying the grant to boards of appeals of power to vary zoning ordinances in this case is that variances shall be in specific cases for the relief of practical difficulty or unnecessary hardship; that the spirit of the ordinance shall be observed, public safety and welfare secured, and substantial justice done. Heretofore in all the states in which the question has come before the courts, except Illinois (*Welton v. Hamilton*, 176 N. E. 333), it has been held that this rule was sufficiently precise and definite. In the present case Maryland aligns itself with Illinois in deciding the contrary. It is worth noting that in both Maryland and Illinois administrative bodies exercise without challenge the power to fix the rates of various public utilities, the rule guiding them in so doing being that these rates shall be reasonable. To the writer the zoning rule which these states reject seems at least as precise and definite.

The statement of the Maryland court in this case with regard to the sufficiency of the rule with regard to practical difficulty and unnecessary hardship was what is technically a "dictum"; i.e., it was not necessary in the decision of the case, which was actually decided upon another point; but it is a deliberate and careful statement by the highest court in the state, and may be accepted without doubt as, from now on, the law of the state.

Official Map—Parks

NEW YORK.—*Matter of Crane-Berkeley Corporation v. Lewis*, 238 App. Div. 124 (April 7, 1933).—The village of Scarsdale had adopted an official map under the law which provides that:

"Before the approval of the planning board of a plat showing a new street or highway, such plat shall also in proper cases show a park or parks suitably located for playground or other recreation purposes. In approving such plats the planning board shall require that the . . . parks shall be of reasonable size for neighborhood playground or other recreation uses. In making such determination regarding . . . parks the planning board shall take into consideration the prospective character of the development, whether dense residence, open residence, business or industrial ([State] Village Law, Section 179—1)."

Scarsdale was one of the early advocates of the official map planning laws of the state, and concedes the validity of the above provision of the state planning law. It has assessed the land set aside for parks for substantial amounts. The Berkeley Corporation contends that these taxes are invalid on the ground that it, by filing its map, has transferred all the assessable value of the park land to the plats on the map which are available for building once the plat owner has sold lots from the plat; and that its deeds to its grantees give to them such use of, or privileges in, the parks as to divest the park lands of all assessable value, and because of this their previous value has been transferred to, and has become reflected in, the enhanced value of the surrounding property.

The assessors of the village in reply say that they have made no increase in the assessed value of these other lands, by reason of the alleged easement in the park lands as appurtenances to these other lands, and urge that there is no such easement. There has been no for-

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nal dedication of the "parks" to the village of Scarsdale, the "fee" of these park lands being still in the corporation. The corporation still has title to 85 lots lying in the development and a neighboring frontage.

The Court decides that the tax, for a substantial amount, against the corporation, of the "park" land, is improper. It cannot be said that, notwithstanding the foregoing statute, the approval by the planning board of the corporation's plat with its streets and parks, the filing by the corporation of its map or plan so approved, and its subsequent sale of lots in the development pursuant to the map, the corporation is free to ignore its established parks and devote their site to private uses. Surely any attempt by the corporation to eliminate the parks and to deprive its grantees of their enjoyment would be held of no effect.

The deeds do not give the grantees from the corporation an easement in the "park" lands, but do create an estoppel for all time from denying to these grantees the use and enjoyment of these parks. This estoppel in effect is the equivalent of the grant of an easement, and its result is to destroy, and as a fact it has destroyed, the taxable value of the park lands to the corporation, which still owns the bare title in fee in them; or, it may be stating it better, it has shifted the taxable value from the park lands to the other lands in the development, to the owners of which the use and enjoyment of the lands for park purposes for all time is assured under the doctrine of estoppel.

EDITOR'S NOTE.—The Court goes on to say: "While the facts in the case at bar differ from those appearing in the Gramercy Park case (*People ex rel. Poor v. Wells*. 139 App. Div. 83), it seems to me they invite the application of the same principle. In the Gramercy Park case it was said that a purchaser of the park would acquire no beneficial interest therein, burdened as it was with sixty-six separate easements of the adjoining lot owners, and the Court held against the validity of its assessment."

The law, applied in similar ways, is the same in many other states.

Excess Condemnation

Oregon has passed a statute empowering municipal corporations to acquire excess lands in laying out highways, and resell them with appropriate restrictions. A number of states have authorized excess condemnation, not only in connection with the laying-out of highways, but with the acquisition of parks and land for other uses; this authorization being sometimes by statute, and sometimes by constitutional amendment, to be followed by statutes. The decision with regard to the validity of statutes under unamended constitutions have often been adverse. The validity under the Constitution of the United States of the state constitutional amendments has never been decided; the only case involving this question in the United States Courts (*Cincinnati v. Vester*, 281 U. S. 439) being decided upon another point. A good discussion of this subject, now a little out of date, will be found in the Transactions of the American Society of Civil Engineers for 1926.

"Listen and Learn About Your Government"

THE first broadcast of the Fifth Series on "You and Your Government" was presented on June 20 by the Committee on Civic Education by Radio of the National Advisory Council on Radio in Education and the American Political Science Association. The new series is entitled "Constructive Economy in Government" and is closely related to the work of the Committee on Citizens' Councils for Constructive Economy, which has been formed by 59 national organizations, for the purpose of preserving as far as possible the educational and social services of government in the present economic crisis. The announcement folder reads:

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June 20
CONSTRUCTIVE OR DESTRUCTIVE ECONOMY
PROF. THOMAS H. REED, Chairman, Committee on Citizens' Councils for Constructive Economy
GLENN FRANK, President of the University of Wisconsin

June 27
SAVING MONEY IN STATE GOVERNMENT
JOSEPH B. ELY, Governor of Massachusetts
PROF. A. N. HOLCOMBE, Harvard University

July 4
THE CRISIS IN GOVERNMENT ECONOMY
ALBERT C. RITCHIE, Governor of Maryland

July 11
MR. TAXPAYER VERSUS MR. TAXSPENDER
DANIEL W. HOAN, Mayor of Milwaukee
LOUIS BROWNLOW, Director, Public Administration Clearing House

July 19
PROTECTING THE TAXPAYER'S DOLLAR
WILLIAM A. COMSTOCK, Governor of Michigan
PROF. H. L. CAVERLY, University of Michigan

July 25
REDUCING THE SCHOOL BUDGET
PROF. JOHN K. NORTON, Chairman, Joint Commission on Emergency in Education of the National Education Association and the Department of Superintendence
ROBERT E. SIMON, Education Chairman, United Parents Association
PROF. GEORGE S. COUNTS, Columbia University

August 1
REDUCING THE LIBRARY BUDGET
H. L. WOOLHISER, City Manager, Winnetka, Illinois
ORA L. WILDERMUTH, Attorney, Gary, Indiana
CARL H. MILAM, Secretary, American Library Association

August 8
REDUCING THE WELFARE BUDGET
CLARENCE PHELPS DODGE, Washington, D. C.
DR. LEWIS MERIAM, Brookings Institution
FRANK BANE, Director, American Public Welfare Association

7:15 P.M. Eastern Daylight Saving Time
6:15 P.M. Eastern Standard Time
5:15 P.M. Central Standard Time
4:15 P.M. Mountain Standard Time
3:15 P.M. Pacific Standard Time

August 15
REDUCING THE RECREATION BUDGET
JOHN H. FINLEY, Associate Editor, New York Times
COL. H. EDMUND BULLIS, Executive Officer, National Committee on Mental Hygiene
ROY SMITH WALLACE, National Recreation Association

August 22
REDUCING THE COST OF JUSTICE
PROF. LEON CARROLL MARSHALL, Institute of Law, Johns Hopkins University
FRANK J. LOESCH, Former President, Chicago Crime Commission

August 29
ARE THERE TOO MANY GOVERNMENTS?
U. S. SENATOR HARRY F. BYRD, Virginia
HENRY MORGENTHAU, JR., Governor, Farm Credit Administration

September 5
REDUCING THE PUBLIC HEALTH BUDGET
GEORGE FOLGER CANFIELD, Attorney, President, State Charities Aid Association
DR. MATTHIAS NICOLL, JR., Commissioner of Health, Westchester County, N. Y.
DR. KENDALL EMERSON, Acting Executive Secretary, American Public Health Association

September 12
MERIT VERSUS SPOILS
HARRY B. MITCHELL, Chairman, United States Civil Service Commission
PROF. CLYDE L. KING, Chairman, Public Utilities Commission of Pennsylvania

September 19
REDUCING THE PUBLIC WORKS BUDGET
CARL SCHNEIDER, New Orleans, President, International Association Public Works Officials
ALFRED E. ROCHE, Commissioner of Public Works, Troy, N. Y.
DONALD C. STONE, Research Director, International City Managers' Association

September 26
SAVING BY PLANNING
ALFRED BETTMAN, President, National Conference on City Planning
GEORGE McANENY, Commissioner of Sanitation of New York City, and President of the Regional Plan Association of New York
FLAVEL SHURTLEFF, Secretary, American City Planning Institute

All the addresses and discussions in this series will be published in the National Municipal Review. Reprints of individual programs may be obtained from the National Municipal League for fifteen cents each, or two dollars for the entire series of fifteen broadcasts. Special prices on quantity orders will be furnished upon request to the National Municipal League, 309 East 34th Street, New York City.

The Municipal Bond Market

Recent sales of new issues, from June numbers of *The Bond Buyer*:

Amount	Borrower and Purpose	Rate (%)	Term (Years)	Basis (%)
$1,000,000	Virginia, Highway	3¼	6	3.05
3,000,000	Massachusetts, Water	3¼	15 (Avg.)	3.18
1,461,800	Albany, N. Y., Relief, Improvement	3⅜	5.4 (avg.)	3.61
3,000,000	Boston, Mass., Refunding	3½	3	3.74
2,300,000	St. Louis, Mo., Relief	4	1-5 (Ser.)	3.80
500,000	Lehigh Co., Pa., County	4	14 1/3 (avg.)	3.86
5,000,000	Missouri, Roads	4	17-21	3.89
587,703	Topeka, Kans., School	4	8½ (avg.)	3 98
335,000	Watertown, N. Y., General, Relief	4.30	5.3 (Avg.)	4.29
1,379,666	Wichita, Kans., School, Funding	4¼	8½ (Avg.)	4.31
500,000	Schenectady, N. Y., Relief	4.4	5.8 (Avg.)	4.36
950,000	Berks Co., Pa., Funding	4¼	15 2/3 (Avg.)	4.14
575,000	Duluth, Minn., School, Funding	4½	5½ (Avg.)	4.42
1.233,700	Troy, N. Y., Relief, Improvement, Tax Title	4½	6.4 (Avg.)	4.43
200,000	Mitchell Co., Ia., Road	4¾	5-6½ (Opt. Avg.)	4.60
200,000	Brockton, Mass., Water	4¾	8.85 (Avg.)	4.69
175.000	Crawford Co. Wis., County	5	5 (Avg.)	5
1,500,000	Milwaukee Co., Wis., Corporate Purpose	4	1-5 (Ser.)	5.09
400,000	Monroe Co., N. Y., Relief	5½	6 (Avg.)	5.37

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MUNICIPAL AND CIVIC PUBLICATIONS

Prices quoted do not include postage, unless so stated.

Public Utilities

Public Utility Regulation.—By William E. Mosher and Finla G. Crawford, School of Citizenship and Public Affairs, Syracuse University. Harper & Brothers, New York. 1933. 612 *pp.* $5.00.

A comprehensive and detailed treatment of the broad subject of public utility regulation has been worked out by two careful, thoroughgoing observers, students and expositors, well known in the field of public administration. The character, functions and facilities of public utility commissions are presented. Problems of policy, powers and administration with respect to the granting of certificates of convenience and necessity, and the regulation of service, rates, security issues, accounting, etc., are searchingly discussed; and special problems, including motor-carrier operation, rural electrification, grade-crossing elimination, municipalities in relation to utilities, public ownership and public relations, are given considerable attention. The public point of view is held to, without its becoming an attitude of propaganda and bias.

H. M. Olmsted.

Municipal Finance

Two reports have been issued by the Civic Research Institute of Kansas City, Mo., in a series on local government finance in that city: (1) "Trends in City Finance in Kansas City, Missouri (March, 1933); (2) "Trends in School Finance—School District of Kansas City, Missouri" (April). The third will be "Trends in County Finance in Jackson County, Missouri," and the fourth will present the probable financial developments, with particular reference to debt requirements and taxes for such requirements, during the next ten years. 40 mimeographed pp. in No. 2. (Apply to the Institute, 114 W. Tenth St., Kansas City, Mo.)

"Model Financial and Departmental Report Forms for Municipalities" are presented in 22 mimeographed pages, prepared by Donald C. Stone, Research Director, and Gustave A. Moe, Chief Accountant, of the International City Managers' Association, and issued by the Public Administration Service, 850 E. 58th St., Chicago, Ill.; together with 6 printed pages of Consolidated Daily Report forms for police departments, these being the standard forms of the Committee on Uniform Crime Records of the International Association of Chiefs of Police. 25c. (Apply to the Public Administration Service.)

Comfort Stations

"Comfort Stations in New York City Today and Tomorrow" covers an admirable piece of work by the Women's City Club of New York through its Committee on Public Health; Dr. S. Josephine Baker, Chairman. It is an illustrated pamphlet of 66 pages, with an inserted large folding map showing the location of all the public comfort stations in the city. The adopted policy of constructive cooperation rather than destructive criticism involved the recommendation of new ways of financing comfort stations, and economies in construction—using city-owned property as sites, and sources of revenue to help meet, at least, part of the maintenance cost. A thorough study of existing conditions and of the human element was made. The recommendations are definite and cover ultimate and immediate action. 10c postage. (Apply to the Club, 22 Park Ave., New York.)

Recreation

"88 Successful Play Activities" is published by the National Recreation Association, 315 Fourth Ave., New York. A revised edition has recently been issued, containing new material, notably sections on Sidewalk and Home Equipment Games. 119 pp. 60c. (Apply to the Association.)

Regional Planning

From Plan to Reality.—By the Staff of the Regional Plan Association, 400 Madison Ave., New York. 1933. 143 *quarto pp. Maps, views, drawings.* $2.00. *Apply to the Association.*

A report of four years' progress on the regional development of New York and its environs, with a program of present needs and opportunities. This inspiring presentation of advance in the realization of a great Plan is of importance to all who believe that city and regional planning is an intelligent, practical, economical means of promoting public welfare for present and future generations; it is of especial value to those who live in the New York Region and can watch and profit by the development of particular improvements. (See the front cover of this issue for a map showing progress on major routes in the proposed regional highway system, 1928—1932; also page 40.) The needs and opportunities of the future are illuminated by the experience gained: some elements must be strengthened; some choices must be made; the general planning principles involved must be emphasized. It is gratifying that progress on this 40-year Plan is moving on schedule time.

"The West Essex Regional Planning Scheme, 1933," is a report prepared for the Advisory Joint Town Planning Committee (chosen from elected representatives serving on each of the local government authorities of the district) by Professor S. D. Adshead of the University of London. (See page 52 of this issue.) It is a delightful, detailed presentation, with many maps and sketches, of the geographical, topographical, historic, archaeological and architectural characteristics of the region, with a study of administrative areas and public services, and recommendations for the preservation and development of its advantages. 120 pp. (Apply to the publishers, J. Alexander & Co., 22, Northumberland Ave., London, W.C.2.)

Public Health

"American Public Health Association Year Book, 1932-1933." Published as a supplement to the June, 1933, issue of the *American Journal of Public Health*, it presents the organization and administration of the Association, and the reports of the 1931-1932 committees on Training and Personnel, Housing of Health Departments, Vital Statistics, Public Health Engineering, Industrial Hygiene, and Food and Nutrition. 141 pp. $1.00. (Apply to the Association, 450 Seventh Ave., New York.)

A valuable pamphlet entitled "Handling Communicable Diseases in New York State Municipalities," by James B. Hume, Jr., is the result of a study made under the joint auspices of the New York State Conference of Mayors and Other Municipal Officials, through its bureaus of Training and Research, and Municipal Information, and the School of Citizenship and Public Affairs of Syracuse University. It is issued as Publication No. 22 of the Bureau of Training and Research. 1933. 51 pp. The problem is presented under these heads: reporting and investigations; care and control of cases; home isolation; hospitalization; and recommendations. New York City is not included, and tuberculosis and tubercular sanitoriums have not been examined in the survey. $1.00. (Apply to the Bureau, Albany, N. Y.)

City Planning

The 1933-34 catalog of the School of City Planning at Harvard University is presented in the April 24, 1933, Official Register of the University. It gives all the information necessary to acquaint those interested with the Faculty of the School, the courses offered, the facilities, equipment, advantages, and the expense involved; also a statement of the requirements of the profession and its place in public service. 47 pp. (Apply to the University, Cambridge, Mass.)

Internal Debts

The Internal Debts of the United States. Edited by Evans Clark. Published for Twentieth Century Fund, Inc. The Macmillan Company, New York. 1933. 430 *pp.* $4.50.

This study represents a vigorous and timely attempt on the part of several contributors and consultants to present a picture of the internal debt situation at present prevailing in this country. The underlying motif of the entire work is that no blanket recommendations are in order for the various types of outstanding debts.

It is found, rather surprisingly, that of the eight classes of debts studied (state and local, Federal, farm mortgage, urban mortgage, railroad, industrial, public utility and financial corporation), urban mortgage debts constitute the largest portion, or 21.7 per cent of the entire outstanding indebtedness. Although the attention of the country has been strikingly drawn to the farm mortgage problem, 60 per cent of the farmers are free of such debt.

Refunding of existing obligations at lower rates of interest, and elimination of the tax exemption feature of Federal issues, are recommended with respect to the national debt. A number of suggestions are made with reference to the more complicated problem of state and local indebtedness. Among them are the redistribution of debt maturities, lower interest charges through Federal refinancing of obligations, reallocation of revenues from gasoline and other taxes to redeem local debts, and various devices for state control of municipal indebtedness.

Two schools of thought concerning the general debt problem are recognized. The first would bring debt into line with prices and production by a downward adjustment of debts; the second would bring debt into line by lifting prices and production. The authors make two general recommendations for immediate action: first, action giving temporary support to the existing debt structure, the details of which should be worked out for particular fields and with respect to individual cases; and, second, active measures, consisting of an extensive program of public works in addition to and coordinate with a program of money expansion, to induce business recovery.

Mabel L. Walker.

Sanitary Engineering

"Progress Report on Sanitary Engineering and Stream Pollution Control Activities of the Wisconsin State Board of Health for 1932; Including a List of Public Water Supplies in Wisconsin and Sewerage Systems as of January 1, 1933." 37 mimeographed pp. (Apply to L. F. Warrick, State Sanitary Engineer, Madison, Wis.)

Salaries

The June, 1933, *Bulletin* of the American Library Association is the Salaries Number. The opening article is by Charles H. Compton, Chairman of the A. L. A. Committee on Salaries and Employment. There is a wealth of statistics on public library salaries in cities of various sizes, and on university, college, normal and high school library salaries. 48 pp. Single copies, 25c. (Apply to the Association, 520 N. Michigan Ave., Chicago, Ill.)

Housing

A study of 1,104 tenement families, members of the League of Mothers' Clubs, showing income, rent, and housing conditions, has been collated by Sidney Axelrad for the League, 70 Fifth Ave., New York, and is presented in 16 mimeographed pages. The appalling conditions disclosed are stated by the League to be proof that commercial housing, while perfectly satisfactory for other groups, is impossible as a means of providing decent homes, at a profit to the landlord, for those whose income is less than $1,500 a year. The project of the League is public housing, on a large scale, managed without profit and exempt from taxation, as the only way to serve this group. (Apply to the League.)

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City Planning

The Public Administration Service (850 E. 58th St., Chicago, Ill.) is publishing a monograph by Russell Van Nest Black, city plan consultant, entitled "Planning for the Small City: An Outline of Principles and Procedure Especially Applicable to the City of Fifty Thousand or Less." It tells the small town operating official how to organize for planning, what the basic necessary information is and how to get it; and, more than that, it tells how to administer planning and zoning. It gives a sample ten-year capital improvement and budget, sample forms of certificate of occupancy, appeals to the board of adjustment, organization charts, etc. In so far as it discusses the technique of planning it does so not as a technical discussion for planning engineers, but rather to paint to the citizen or official who might be interested in planning what modern planning has to offer a small town. About 112 pages, with over 30 illustrations.

CHARLES S. ASCHER.

Other Reports Received

DETROIT, MICH.—"Public Health in a Year of Stress": Annual Report, Department of Health, 1932. 36 pp.

LYNCHBURG, VA.—Annual Report, 1932. 102 quarto pp.

MARQUETTE, MICH.—Annual Report (Commission Government), 1932. 83 pp.

MCPHERSON, KANS.—Annual Report (Commission Government), 1932. 24 pp.

CONVENTIONS—WHEN AND WHERE

(Figures in parentheses following the name of the convention city indicate the estimated attendance other than local)

JULY 1-7.—CHICAGO, ILL. (11,000)
National Education Association of the United States. Annual meeting. Secretary, J. W. Crabtree, 1201 16th Street, N. W., Washington, D. C.

JULY 6-7.—CLEVELAND, OHIO.
National Conference on Slum Clearance. Secretary, John H. Millar, 1503 Builders Exchange Building, Cleveland, Ohio.

JULY 10-12.—QUEBEC, QUE. (100)
Union of Canadian Municipalities. Annual convention. Secretary, Samuel Baker, City Clerk, London, Ont.

JULY 11-14.—SANDUSKY, OHIO. (200)
Ohio State Police Chiefs Incorporated. Annual convention. Secretary, E. G. Krause, 1020 Guardian Building, Cleveland, Ohio.

JULY 13-14.—MITCHELL, S. DAK. (25)
South Dakota Commercial Secretaries' Association. Semi-annual meeting. Secretary, Paul K. Myers, Huron, S. Dak.

JULY 14-15.—CRAWFORDSVILLE, IND. (50)
Indiana Commercial Secretaries Organization. Annual meeting. Secretary, Glen B. Maple, Chamber of Commerce, La Porte, Ind.

JULY 25-27.—HARRISBURG, PA. (250)
Pennsylvania Chiefs of Police Association. Annual convention. Secretary, H. S. Carey, Police Captain, Altoona, Pa.

JULY 31—AUGUST 3.—CHICAGO, ILL. (700)
International Association of Chiefs of Police. Anual convention. Secretary, George Black, Chief of Police, Wilmington, Del.

AUGUST 7-9.—TRAVERSE CITY, MICH.
Michigan State Fire Chiefs' Association. Annual convention. Secretary, George F. Dansbury, Grosse Pointe Farms, Mich.

AUGUST 14.—MILWAUKEE, WIS. (400)
Association of American Cemetery Superintendents. Annual convention. Secretary, William B. Jones, Superintendent of Highwood Cemetery, Pittsburgh, Pa.

AUGUST 15-17.—DECORAH, IOWA.
League of Iowa Municipalities. Annual meeting. Secretary-Treasurer, Frank G. Pierce, Marshalltown, Iowa.

AUGUST 21-27.—SAILING FROM CLEVELAND TO CHICAGO. (600)
International Association of Fire Chiefs. Annual convention. Secretary, James J. Mulcahey, Yonkers, N. Y.

AUGUST 22-24.—LIVERPOOL, N. S. (250)
Union of Nova Scotia Municipalities. Annual convention. Secretary, Hon. Arthur Roberts, Bridgewater, N. S.

AUGUST 28-31.—DELAVAN LAKE, WIS. (400)
Illuminating Engineering Society. Annual convention. General Secretary, D. W. Atwater, 29 West 39th Street, New York.

AUGUST 28-30.—MARQUETTE, MICH. (150)
Michigan Association of Chiefs of Police. Annual convention. Secretary-Treasurer, Donald S. Leonard, 404 Commerce Building, Detroit, Mich.

AUGUST 29-31.—SYRACUSE, N. Y. (100)
National Identification Association. Annual convention. Secretary-Treasurer, E. W. Livingston, Jamesville, N. Y.

AUGUST 30—SEPTEMBER 1.—TORONTO, ONT. (200)
Ontario Municipal Association. Annual meeting. Secretary-Treasurer, H. L. Brittain, 137 Wellington Street, W., Toronto, Ont.

SEPTEMBER 4-9.—TORONTO, ONT.
American Association of Port Authorities. Annual convention. Secretary, Tiley S. McChesney, 2223 Short Street, New Orleans, La.

SEPTEMBER 5-7.—STATE COLLEGE, PA. (130)
Pennsylvania Sewage Works Association. Annual meeting. Secretary, L. D. Matter, Kirby Health Center, Wilkes-Barre, Pa.

SEPTEMBER 6-8.—WHITE MTS., N. H. (500)
American Forestry Association. Annual meeting. Executive Secretary, Ovid Butler, 1727 K Street, N. W., Washington, D. C.

SEPTEMBER 7-8.—NEW YORK. (200)
National Shade Tree Conference. Annual convention. Secretary-Treasurer, Dr. Rush P. Marshall, Yale University, New Haven, Conn.

SEPTEMBER 7-9.—STATE COLLEGE, PA. (200)
Pennsylvania Water Works Operators' Association. Annual convention. Secretary-Treasurer, I. M. Glace, 506 South Office Building, State Capitol, Harrisburg, Pa.

SEPTEMBER 9-19.—CRUISE FROM MONTREAL TO CHICAGO. (400)
Union of the Municipalities of the Province of Quebec. Annual convention. Secretary-Treasurer, T. D. Bouchard, 132 St. James Street, Montreal, Que.

SEPTEMBER 14-15.—RUSSELL, KANS. (200)
Kansas Association of Municipal Utilities. Annual convention. Secretary-Treasurer, L. C. Angevine, Superintendent, Water and Electric Department, McPherson, Kans.

SEPTEMBER 17-20.—CHICAGO, ILL. (350)
American Institute of Park Executives and the American Park Society. Annual convention. Executive Secretary, William H. Walker, 2234 Inglewood Place, South Bend, Ind.

SEPTEMBER 18-20.—CHICAGO, ILL.
American Transit Association and Affiliated Associations. Annual convention. General Secretary, Guy C. Hecker, 292 Madison Avenue, New York.

SEPTEMBER 18-21.—SANTA CRUZ, CALIF. (1,000)
League of California Municipalities. Secretary-Manager, R. Earl Ruddy, 1095 Market Street, San Francisco, Calif.

SEPTEMBER 18-20.—CHICAGO, ILL.
International City Managers' Association. Annual convention. Executive Director, Clarence E. Ridley, 923 East 60th Street, Chicago, Ill.

SEPTEMBER 19-22.—BRIDGEPORT, CONN.
New England Water Works Association. Annual convention. Secretary, Frank J. Gifford, 715 Tremont Temple, Boston, Mass.

SEPTEMBER 21-23.—MILWAUKEE, WIS.
International Association of Public Works Officials. Annual convention. Secretary, A. M. Anderson, 100 North LaSalle Street, Chicago, Ill.

SEPTEMBER 22-25.—CHICAGO, ILL. (500)
The Public Ownership League of America. Biennial conference. Secretary, Carl D. Thompson, 127 North Dearborn Street, Chicago, Ill.

SEPTEMBER 24-27.—NEW YORK.
National Association of Commercial Organization Secretaries. Annual convention. Secretary-Treasurer, C. M. Anderson, Chamber of Commerce, Memphis, Tenn.

SEPTEMBER 25-27.—MILWAUKEE, WIS. (200)
American Society of Municipal Engineers. Annual convention. Secretary, C. W. S. Sammelman, 4359 Lindell Boulevard, St. Louis, Mo.

SEPTEMBER 25-27.—MILWAUKEE, WIS.
American Water Works Association—Wisconsin Section. Annual convention. Secretary, L. A. Smith, Superintendent of Water Works, City Hall, Madison, Wis.

SEPTEMBER 26-29.—WILKES-BARRE, PA.
International Association of Municipal Electricians. Annual convention. Secretary, W. H. Harth, Columbia, S. C.

SEPTEMBER 30—OCTOBER 2 (?).—BALTIMORE, MD.
National Conference on City Planning, and American City Planning Institute. Annual meeting. Secretary, Flavel Shurtleff, 130 East 22d Street, New York.

OCTOBER 2-6.—CHICAGO, ILL. (3,000)
National Safety Council. Annual congress. Managing Director, W. H. Cameron, 20 North Wacker Drive, Chicago, Ill.

OCTOBER 4-5.—SPRINGFIELD, MASS. (160)
Massachusetts Police Association. Annual convention. Secretary, James F. Rogers, 338 Malden Street, Medford, Mass.

OCTOBER 7-9.—INDIANAPOLIS, IND.
Conference of State Sanitary Engineers. Annual meeting. Secretary-Treasurer, R. E. Tarbett, U. S. Public Health Service, Washington, D. C.

OCTOBER 9-12.—INDIANAPOLIS, IND.
American Public Health Association. Annual meeting. Acting Executive Secretary, Dr. Kendall Emerson, 450 Seventh Avenue, New York.

OCTOBER 12.—INDIANAPOLIS, IND.
Central States Sewage Works Association. Joint meeting with the American Public Health Association. Secretary-Treasurer, G. H. Radebaugh, Urbana & Champaign Sanitary District, Urbana, Ill.

OCTOBER 12-14.—INDIANAPOLIS, IND.
International Association of Dairy and Milk Inspectors. Annual meeting. Secretary-Treasurer, Dr. Paul B. Brooks, State Department of Health, Albany, N. Y.

OCTOBER 16-20.—PHOENIX, ARIZ. (500)
National Tax Association. Annual conference. Secretary, W. G. Query, South Carolina Tax Commission, Columbia, S. C.

OCTOBER 16-19.—OKLAHOMA CITY, OKLA. (350)
Southwest Water Works Association. Annual convention. Secretary-Treasurer, Lewis A. Quigley, Fort Worth, Texas.

OCTOBER 16-18.—CHICAGO, ILL. (200)
Special Libraries Association. Annual convention. Secretary, Rebecca B. Rankin, Municipal Building, New York.

OCTOBER 16-18.—HARLINGEN, TEXAS. (300)
League of Texas Municipalities. Annual convention. Executive Secretary, Harvey W. Draper, 319 Kress Building, Houston, Texas.

OCTOBER 20-24.—OAKLAND, CALIF.
American Water Works Association—California Section. Annual convention. Secretary-Treasurer, R. F. Brown, P. O. Box 506, Stockton, Calif.

OCTOBER 26-28.—ST. LOUIS, MO. (100)
American Water Works Association—Missouri Valley Section. Annual meeting. Secretary, Earl L. Waterman, University of Iowa, Iowa City.

NOVEMBER 6-8.—STATESVILLE, N. C.
American Water Works Association—North Carolina Section. Annual meeting. Secretary, Professor H. G. Baity, University of North Carolina, Chapel Hill, N. C.

NOVEMBER 8.—ATLANTIC CITY, N. J.
Governmental Research Association. Annual meeting. Secretary-Treasurer, Robert M. Paige, Drexel Avenue and 58th Street, Chicago, Ill.

NOVEMBER 9-11.—ATLANTIC CITY, N. J.
National Municipal League. Annual convention. Acting Secretary, Howard P. Jones, 302 East 35th Street, New York.

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NEWS AND ILLUSTRATIONS

Items of Interest to City, Town and County Officials, and Others Concerned with the Economical Construction and Efficient Operation of Public Improvement Undertakings

Preventing Street Loading Islands from Becoming Traffic Hazards

CINCINNATI has relatively narrow streets, and in the downtown section each main thoroughfare is traversed by one or more city street-car lines. To secure the safety of pedestrians waiting to board cars, the City Highway Division, under H. H. Krantz, Superintendent of Highways, created a modified design of reinforced concrete safety island, appropriate to local conditions. These islands are 4 feet wide, and from 40 to 60 feet long, and are raised 6 inches above the street level. They are protected at each approach and are brilliantly illuminated at night.

Dirty Islands a Real Menace to Traffic

There are certain factors that make street-car island cleanliness essential. The platform forms a barrier against which is deposited all sorts of litter and refuse; fumes from motor exhausts are blown into the fibers of the concrete; dust, soot, sand, gravel and coal droppings from trucks add their quota; and when it rains or snows, the entire structure is spattered with mud or slush from passing vehicles. Thus soiled, the safety island becomes a potential traffic hazard. The colors which are supposed to be danger signals blend with the colors of the surrounding street, and the island becomes less distinctly visible.

Cincinnati has adopted a brilliant white for loading platforms, for two reasons: in the early twilight created by tall buildings in narrow streets, a brilliant white is more readily discerned; and since white soils readily, there is an incentive for more frequent cleaning. Recognizing the protective feature of cleanliness, the Highway Division made attempts at manual cleaning. This method proved ineffectual, for the situation was manifestly beyond the capacity of the crew employed for the purpose, so that the real cleaning operation covering all the islands was performed only two or three times a year. They attempted to meet the resulting condition by periodic repainting, which was unsatisfactory and expensive; successive layers of paint cracked and finally peeled, leaving a rusty, mottled appearance which could be improved only by removing all the paint and refinishing the safety zones anew.

Mechanically Applied Hot Water Vapor Solves the Problem

The Highway Maintenance Division operating out of the Carmony Avenue municipal garage had achieved extremely satisfactory results in the cleaning of maintenance equipment by a hot water vapor process. For test purposes the vapor cleaning machine was transferred for safety island cleaning use. The machine, which is made by the Homestead Valve Manufacturing Co., of Coraopolis, Pa., is a self-contained unit supplying water at 198 degrees F., with a nozzle velocity of 150 or more pounds pressure per square inch. When this hot water strikes the atmosphere, it flashes into a spray which pelts the area to be cleaned with fine globules of water like grains of sand carried in an air stream, but of course without abrasive effect. With proper detergents introduced into the feed water, the entire concrete base and surrounding areas, including the beacons at the approaches, are thoroughly cleaned. When the concrete has dried, it has the color of new construction; the machine operation removes all the litter from around the base of the platform, erases all the fruit and tobacco stains, dissolves all grease and oil deposits, and leaves the structure as clean as when newly erected.

The adaptability for island cleaning service is apparent. It does not eject a large quantity of water in a solid stream; rather it diffuses a spray which might readily be mistaken for steam. There is no splashing, and, as only 5 or 6 gallons of water are required to clean a single safety zone, no sloppy conditions are created. Since the unit is self-contained and portable, supplying its own heat and carrying its own water supply, it need not be attached to a city hydrant; thus traffic is not blocked while the work is being performed.

Good Results of This System in Cincinnati

The illustration shows the entire equipment used by the Cincinnati Highway Division for this work, mounted on a city truck which also carries a 300-gallon tank of water, enough for a whole day's operation. With a driver and a machine operator, from 7 to 10 minutes is required for the cleaning of an island, and, working on a shortened labor schedule, this crew cleans from 23 to 28 islands a day.

This system has been in use about a year, and the hot water vapor cleaning equipment is now used exclusively by the island cleaning division. The painted surfaces show no sign of disintegration, and it is apparent that, using a good quality of paint, repainting at intervals of a year or more will be sufficient. The time economy makes it possible to clean all islands as often as every three weeks, and the unit cleaning cost has been reduced to the minimum. If a heavy snow or rain storm soils structures which have been cleaned the previous day, this portable outfit can clean a large number of the downtown islands immediately; thus the routine of cleaning is made flexible and effective.

Courtesy of Homestead Valve Mfg. Co., Coraopolis, Pa.

THE "HYPRESSURE JENNY" CLEANING A SAFETY ISLAND IN CINCINNATI

Broad St., Durham, N. C.

Looking north from Main Street. This fine, hard-surface paving was laid with Trinidad Sheet Asphalt eighteen years ago. It is still good for many more years of service. There are more than a million and a quarter square yards of Native Lake Asphalt streets in Durham, N. C.

Long life and low maintenance cost

This is the record of Trinidad Lake Asphalt.

We have abundant proof in the service given by streets and roads laid or re-surfaced with Trinidad Lake Asphalt throughout the United States and in foreign countries.

If you are among those officials confronted with deteriorating streets and roads, yet with reduced appropriations to work with, consider the durability and economy of Trinidad Lake Asphalt.

It may be used over foundations of old concrete, granite, brick, wood-block or macadam. You have a new road that will last for years—for the cost of an asphaltic top. And if repairs are ever needed they can be neatly made, and with maximum economy.

It will pay to investigate. Write for information regarding the outstanding record of Trinidad Lake Asphalt pavements.

THE BARBER ASPHALT COMPANY
Philadelphia

New York Chicago St. Louis

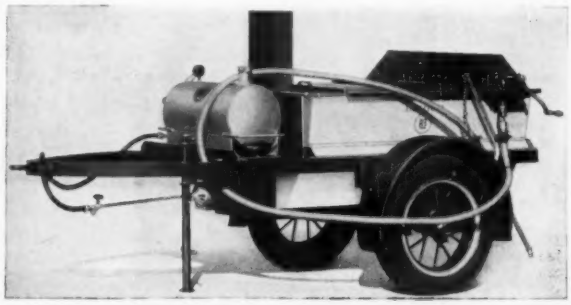
TRINIDAD
NATIVE LAKE
ASPHALT

Don't
let worn-out Equipment cut into your
HIGHWAY FUNDS

Worn-out equipment costs money. Every time there is a breakdown, the result is delay—and delay means money. That's when new equipment helps you keep within your appropriation.

Tar Kettles don't last forever; neither do tool boxes, paving tools, or other maintenance outfits. Replacements must be made; but, there is no need to make a large outlay for new equipment. Take care of the good equipment you have and replace the worn-out pieces that cost you money to operate.

Keep your highway department operating on an efficient basis; re-equip with new Littleford outfits purchased at the lowest prices in the history of Littleford Bros. Write for a copy of our Road Equipment Catalog and select the outfits you need.



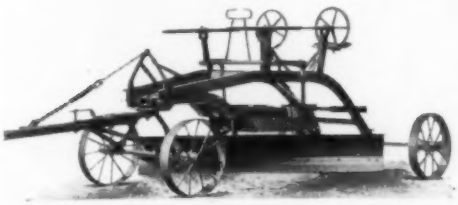
The Littleford No. 84-HD Tar and Asphalt Kettle, when equipped with our hand spray attachment, makes a complete low-priced maintenance unit ideal for penetration patch work.

Stop loss and theft of tools by keeping them in the Littleford HanDeeBox. It is made entirely of steel. One lock securely fastens both covers. There are no padlocks. The City of Cincinnati uses a fleet of twenty-two HanDeeBoxes.

LITTLEFORD
Road Maintenance Equipment
SINCE 1900
LITTLEFORD BROS. 500 E. PEARL ST. CINCINNATI, O.

A Light Straight Steel Grader for Two-Horse Operation

For light grading and general maintenance the Galion Iron Works & Mfg. Co., Galion, Ohio, has announced the new Galion Pony grader which weighs only 1,395 pounds complete and yet possesses exceptional strength and rigidity due to thorough bracing and all-welded connections. All necessary adjustments, such as raising the right or left side of the moldboard independently, reversing the moldboard, side shifting the moldboard and frame, and adjusting the pitch and angle of the moldboard, are easily made.



THE NEW GALION PONY GRADER

A 4-inch channel frame, weighing 6.25 pounds per foot, and an extra-strong moldboard assembly, well braced, combine to insure ample strength to withstand severe shock and strain. Strong steel wheels of 26-inch diameter are mounted on 1½ x 7-inch plain bearings enclosed in dust-proof hubs. This grader is made for one-man and two-horse operation.

A New Type of Reflecting Traffic Sign

Traffic warning signs, direction signs, and even large roadside highway maps, in which the arrows, letters and the network of highways are made of a new reflecting material called Starlume so that they stand out as a highly illuminated electric sign, have been developed by the North American Service Co., 311 North Desplaines Street, Chicago, Ill. The new reflecting glass used in these signs is sealed to the base metal in such a way as to be impervious to moisture and so that weather does not reduce the reflecting ability of the glass. It is claimed that cracking of the glass only increases the brilliance of its reflecting, up to a point where the glass is completely pulverized. The fact that the entire surface of letter or arrow is luminous gives greater legibility and makes the sign visible for a much greater distance.

The glass is made in various colors, so that the standard colors of warning and danger signals may be used in the reflecting unit. The character of the glass is such that light is reflected at all angles from the face of the sign up to about 60 degrees from a perpendicular to the face of the sign yet gives no glare under direct light. Since there is no salvage value to the material after the sign is destroyed, Starlume traffic signs should be reasonably free from the vandalism which so often shows effects on highway structures.

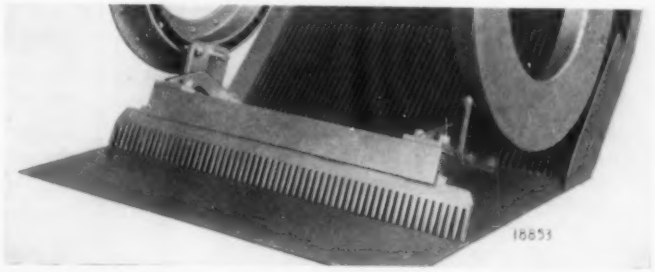
Worthington and Gamon Consolidate Meter Interests

Worthington Pump and Machinery Corporation, Harrison, N. J., and Gamon Meter Co., Newark, N. J., have consolidated their operations in the manufacture and sale of meters through the newly organized Worthington-Gamon Meter Co. Sales headquarters for the company have been established at Harrison, N. J. All manufacturing operations will be concentrated in the Gamon plant nearby in Newark, N. J.

The officials of the new company are: E. T. Fishwick, President; G. H. Gleeson, Vice-President in charge of sales; J. A. Bonnet, Secretary; and R. R. Anderson, Works Manager. These officials have been drawn entirely from the Worthington and Gamon organizations. The complete lines of meters as previously built by Worthington and Gamon for hot and cold water, beverages, chemicals, oil and grease, in disc, turbine, compound and piston types, will be continued.

New Type Screens to Be Installed at Lancaster, Pa., Sewage Treatment Plant

For the two new activated sludge plants now under construction for the city of Lancaster, Pa. (J. N. Chester, Inc., of Pittsburgh, engineers), the Jeffrey Mfg. Co., Columbus, Ohio, has designed four self-cleaning bar screens of a new type. These screens are provided with a special hinged scraper which prevents jamming of the mechanism from the accumulation of foreign material in the bottom of the channel or upon the screen proper. The teeth of this special hinged scraper, acting as a comb, pass entirely through the bars of the screen, cleaning not only the surface but the space between the bars, thus eliminating grease formation.



A CLOSE-UP OF THE HINGED SCRAPER MECHANISM OF THE NEW JEFFREY SELF-CLEANING BAR SCREEN

The scraper mechanism on the new Jeffrey screen descends in a runway somewhat removed from the screen, thus entering the sewage back of or behind the accumulated refuse. Upon reaching the bottom of the channel the scraper drags horizontally for a distance of approximately 2 feet before reaching the screen. At this point it ascends with the teeth projecting entirely through the screen, and in this position comes up under the floating refuse, carries it to the top, and discharges it into suitable receptacles. At the discharge point the scraper engages a wiper which removes any material that may adhere to it. This wiper, being counterbalanced, returns to its normal position after the scraper passes.

The control mechanism is such that the screens may be operated continuously or at intervals of from two seconds to one hour.

Reorganization of Robert and Company, Inc., Atlanta, Ga.

As L. W. Robert, Jr., formerly President of Robert and Company, Inc., architects and engineers, Atlanta, Ga., has been appointed Assistant Secretary of the Treasury of the United States and taken over his work in Washington, he has resigned his private practice. Cherry L. Emerson, formerly Vice-President and Chief Engineer, has been elected President of Robert and Company, Inc.; Jesse M. Shelton, formerly Vice-President, will be Vice-President and Treasurer; and Captain L. W. Robert, Sr., continues to act as Secretary.

Stowitts Opens Consulting Office

George P. Stowitts, member Am. Soc. C. E., has announced the opening of an office for the general practice of civil and consulting engineering at the Transportation Building, Cincinnati, Ohio. Mr. Stowitts will specialize in reports, designs, and supervision on foundations, structures, railways, highways, earthwork, and land and marine terminals.

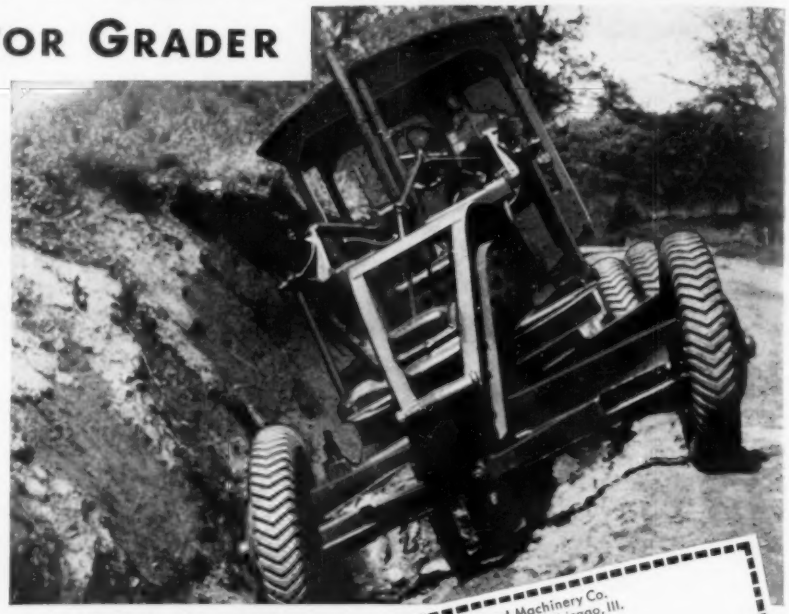
Mead, Ward and Hunt, Consulting Engineers

Daniel W. Mead and Charles V. Seastone have announced that their engineering business will hereafter be conducted by Harold W. Mead, Clayton N. Ward and Henry J. Hunt, former associates, who will continue the business at the State Journal Building, Madison, Wis., under the name of Mead, Ward and Hunt, with Clayton N. Ward as Chief Engineer. This firm will furnish reports, plans, specifications, supervision and appraisals for hydro-electric developments, central steam plants, power transmission, water supply and purification, sewerage and sewage disposal plants, and flood protection. Daniel W. Mead and Charles V. Seastone will continue their association with the new firm in advisory capacities.

Road builders are CUTTING COSTS with the "77" MOTOR GRADER

on—

Ditching
Sub-grade *Building*
Oil Mixing
Graveling



"The best machine in my whole outfit," says one well-known road-builder.* Accuracy, high speed and large capacity make its economy outstanding.

The stability of the *new wide front axle*, the speed range of *a six-speed transmission*, and operation ease *from hydraulic controls*, combine to afford flexibility that has widened the work range of the Motor Grader to include a multiplicity of applications in road building as well as maintenance work. Write for information today.

The Austin-Western Road Machinery Co. Home Office: 400 N. Michigan Avenue, Chicago, Illinois. Branches in Principal Cities.

* Name on request.

›Write for this cost data

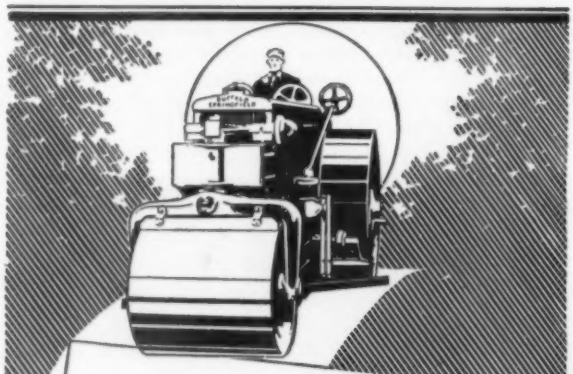
NO. 113A

Austin-Western

ROAD ROLLERS, CRUSHING & SCREENING PLANTS, SCARIFIERS, SWEEPERS & SPRINKLERS, ROAD GRADERS, ELEVATING GRADERS, MOTOR GRADER DRAGS, SHOVELS, DISTRIBUTORS, WAGONS, SNOW PLOWS.

The Austin-Western Road Machinery Co.
400 N. Michigan Ave., No. A4, Chicago, Ill.
Please send me complete information and cost data on the Motor Grader as road builder's equipment.

Name _____
Address _____ State _____
City _____



"Ruggedness of design is the basic reason for the reliability of Buffalo-Springfield rollers."

The Buffalo-Springfield Roller Co.
Springfield, Ohio

BUFFALO-SPRINGFIELD

Carey Elastite EXPANSION JOINT

makes *Good* Paving *Better*

The "sandwich" joint which protects concrete paving against expansion and contraction stresses. Proved by 20 years' use in highways and sidewalks in all parts of the world. Large stocks in principal cities insure immediate shipment. Write for catalog and 1933 prices.

THE PHILIP CAREY COMPANY
Department E-1 **Lockland, Cincinnati, Ohio**
Branches in Principal Cities

Your Home in Toledo

Quiet . . . Homelike . . . just away from the downtown noise . . . yet within a few minutes' walk of the business center. 600 rooms from $2.50 single, with bath. Garage in building. Excellent cuisine . . . two popular priced restaurants. Comfortable beds . . . combination baths . . . kitchenette units, with bedroom and in-a-door bed, bath and living room from $3.00 single, up. Toledo's newest hotel.

The HILLCREST

J. A. RILEY, Mgr.
Madison at Sixteenth Toledo, Ohio

When you write for that catalog, kindly mention THE AMERICAN CITY

Three New 6-Cylinder Trucks

Three new 6-cylinder trucks, known as 15A, 20A and 25A and rated at 1½, 2- and 2½-ton respectively, have been announced by the Federal Motor Truck Co., Detroit, Mich. The new modern appearance introduced in Federal trucks this year is carried out in each of these new models and includes such features as long streamline hood and cowl, door-type ventilators, wide fenders, large chrome-plated slanting V-type radiator, wide chrome-plated front bumper, and full chrome-plated headlights with twin disc chrome-plated horns mounted underneath.

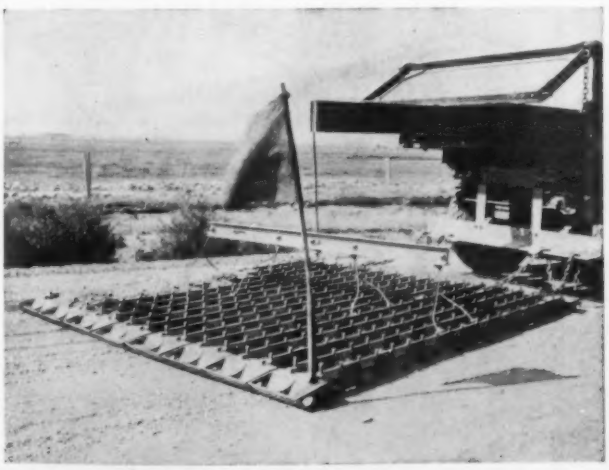
The outstanding characteristic of these new trucks is their sturdy and substantial construction. The frames have a maximum depth of 8½ inches and the chassis weights are 3,500 pounds for the 1½-ton model, 3,900 for the 2-ton and 4,500 for the 2½-ton model. These trucks are equipped with 6-cylinder seven-bearing truck engines which furnish power at a low governed engine speed.

A New High-Speed Tool for Dry Road Maintenance

Complete control of corrugations, and striking economies in dry road maintenance, are claimed for the Denver Road File, which has been developed by The Automobile Storage Elevator Co., 304 Flatiron Building, Denver, Colo. This tool consists of a number of blade-like sections, each section made up of an assembly of alloy steel castings which support and clamp the hardened special steel teeth. One through bolt clamps the entire assembly, and the sections are joined into a complete tool by means of flat steel springs that contribute the lateral flexibility which assures conformation to the road contour, and which permits operation at high speeds without jump or chatter. The teeth are clamped with a pressure which permits driving them down with a light hammer, but such that road shocks will not drive them back. Thus the only tool required for normal adjustment and take-up for wear is a hammer.

The blade assembly is 5 inches in width, and the teeth are made 8 inches in length. When a tooth has been worn and driven down until its upper end is flush with the top of the blade, a new tooth is started on top of the worn one. The operating characteristics of the Denver Road File are capable of wide modification; thus the tooth projection ranges from as much as 1 inch for tearing up dirt roads down to ¼-inch or less for use on sand or oil tops where only a light blading action is desired. The angle of travel is adjustable to suit road travel with the traffic or against it, and to blade material towards or away from the road center.

The Denver Road File is a sectionalized tool and can be assembled in any width ranging from 5 feet as used on narrow dirt roads up to 10 or 12 feet as used on broad highways. Standard equipment includes the Road File, a hand-operated lift, draft hooks, chains and attachments for any standard truck, a set of tools and one extra set of teeth.



THE NEW DENVER ROAD FILE

A Receivership Asked for Norwood Engineering Company

A petition for a receiver for the Norwood Engineering Co., with a factory at Florence, Mass., was presented on April 27, 1933, in the Federal District Court in Boston. At a hearing held on May 8 Howard W. Hosford, General Manager of the company for a number of years, and G. Wilson MacDow, Treasurer of the company for the past ten years, were appointed receivers.

According to a statement by Mr. MacDow it was found necessary by the directors of the company to ask for a friendly receiver to protect the creditors of the company, which had approximately $80,000 of unsecured notes falling due April 30, which they found they were unable to meet in full. Consequently, to avoid permitting a few of the noteholders to secure a preferred position, it was deemed best to ask for a receiver for the purpose of conserving the assets and to place them in a position where all creditors would be treated on equal terms.

The company is the largest concern in the country manufacturing filtration equipment and has hundreds of installations all over the country. It would be a serious handicap to all concerned if the company had been forced by the creditors to close the plant and liquidate. For the preservation of the assets and the fair treatment of all interested parties, it was deemed wisest to have a receiver appointed for the purpose of continuing the business.

The plant of the Norwood Engineering Co. is located at Florence, Mass. The company was organized in 1893 and started with two small buildings. The present plant covers approximately four acres of land and consists of a large foundry where both iron and brass castings are made, a fully equipped machine shop, an assembling plant and several storage buildings.

The plant has manufactured and installed water purification and filtration plants for towns and cities and large manufacturing plants such as paper and textile mills, dye works and other industries requiring pure water. The firm also manufactures a full line of paper-mill machinery for finishing glassine, book, ledger and bond papers. It has also installed filtration plants for swimming pools, and more than 650 of these installations have been made in various parts of the country.

Making Night Driving Safe

With the present tendency toward high speed driving only, a very short time is available for reading highway markers and at night this time is reduced to a small fraction of a second. Attention is forcefully called to this matter by Joe L. Long, Manager, Highway Department, North American Service Co., Chicago, Ill. The marker containing useless words holds the driver's eye away from the road a much longer time than the marker conveying the same information by the use of symbols, and thus adds appreciably to the hazards of night driving. It is equally important that the marker be as visible by night as by day. The suggestion is therefore made that all curves, turns, cross-roads, side-roads, and other common warning signs carry only an appropriate symbol with no qualifying word, exception being made for "Stop," "Danger," and "Slow."

In order to increase visibility of highway markers at night, the universal use of reflecting devices is advocated. Mr. Long predicts that five years from now not a trunk line highway in the United States will be found with a single traffic marker that is not visible by night as well as by day. The cost of installing completely luminous markers on paved roads is estimated at less than one per cent of the investment. Massachusetts now has most of its Federal numbered highways illuminated with reflecting buttons.

C. R. Crowder Heads Own Company

C. R. Crowder, well known in the Southeast, and for several years Southeastern Sales Engineer for U. S. and American Radiator Co., has announced the formation of his own company for the distribution of equipment to the jobbing, plumbing, heating, industrial, municipal, consulting and architectural trades and professions. Mr. Crowder will represent Yeomans Bros. Co., Chicago, manufacturer of pumps. This new company will have offices at 1337 18th Avenue, South, Birmingham, Ala.

GENERAL ILLUMINATION ENGINEERING CO.

Cincinnati, Ohio · · · · · · Carew Tower

COMING . . General Illumination Engineering Co. will shortly make an announcement of profound importance to every one interested in the design, installation or purchase of street lighting or street lighting equipment. It points the way to greater economies and increased efficiency. Advance information will be mailed on request. Send your name and address to General Illumination Engineering Co., Carew Tower, Cincinnati, O.

STREET LIGHTING
- ZONING SURVEYS
- ILLUMINATION ANALYSIS
- ELEC. RECOMMENDATIONS
- VALUATION APPRAISALS
- RATE ADMINISTRATION
- CONTRACT SUPERVISION

FLOODLIGHTING
- AIRPORT
- ARCHITECTURAL
- DISPLAY
- INDUSTRIAL
- RECREATIONAL

LIGHTING EXPERTS SELLING NOTHING BUT SERVICE

SINCE 1867
COLDWELL

Above: Coldwell "L-Twin" motor lawn Mower and roller. Mows and rolls simultaneously 4 to 6 acres a day on one gallon of gasoline. With gang units attached it cuts a 60-inch swath, ten acres per day on one gallon of gasoline.

A Dependable and Economical Power Lawn Mower Is Bound to Be Satisfactory

THE Coldwell Power Lawn Mowers and Rollers perform the two operations simultaneously which cut the cost and produce finer results.

The Twin cylinder motors deliver an abundance of power for all cutting conditions and provide large capacity mowing at small expense.

Sturdy but simple construction throughout insures dependable performance.

There's a style and size suited for any type of lawn.

Sales and Service facilities in all principal localities.

Full particulars on request.

COLDWELL LAWN MOWER CO., NEWBURGH, N. Y., U. S. A.
In Canada—Taylor-Forbes Co., Ltd., Guelph
Manufacturers of DEPENDABLE *Lawn Mowers* — HAND, HORSE, GASOLINE, ELECTRIC

SPEED TRAFFIC SAFELY *with* Duers Automatic Traffic Whistle

Easily attached to your present traffic signal system, the DUERS Whistle sounds exactly like a policeman's whistle. Its clear, sharp blast as the amber light comes on makes both driver and pedestrian more alert, and speeds up the traffic both in starting and stopping.

"A notable advance in automatic traffic control," say leading traffic engineers.

Write for illustrated booklet

DUERS SIGNAL CO. Inc.
GLENS FALLS, NEW YORK

A ROYAL WELCOME
In New York

Right in the center of things . . . The LINCOLN . . . excellent in service . . . cordial in tone . . . offers 1,400 sunlit rooms, each with radio, servidor and bath-with-shower!

Also . . . delicious food at sensible prices in the NEW Dining Room, Grill and Cafeteria.

$2.50 Single • $3.50 Double

JOHN T. WEST, Manager

HOTEL LINCOLN
44th to 45th Street — 8th Avenue
NEW YORK

"A RELIANCE HOTEL"

Portable Asphalt Maintenance Plants

A PORTABLE UNIT WITH A CAPACITY OF 400 YARDS PER DAY

ACCURATE CONTROL OF MATERIALS ASSURING ACCURATE MIXTURE TO COMPLY WITH ANY STANDARD SPECIFICATIONS

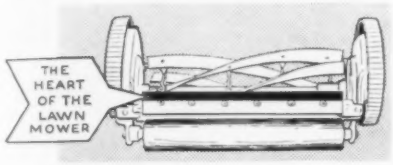
Send for Bulletin R-400

HETHERINGTON & BERNER INC.
INDIANAPOLIS, IND.

Stationary — Railway — Portable and Semi-Portable Plants

A New Cutting Blade for Lawn Mowers

A dull or poor cutting blade on lawn mowers will pull the grass and tend to injure the roots, thereby destroying the charm and beauty of the lawn. The Brunite cutting blade, a product of the Miller Power Lawn Mower Co., 6662 Pearl Road, Cleveland, Ohio, is made of special processed Swedish steel designed to insure a lasting, keen cutting edge. It is guaranteed to render five years of satisfactory service and is made to fit any type or size hand or power mower.



THE BRUNITE BLADE

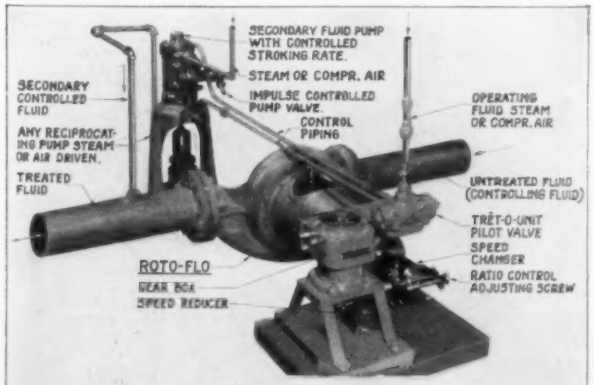
The Brunite blade is easy to install, the old blade being removed by taking out the screws, bolts or rivets. Then the old blade is replaced with the cutting edge to the rear, and the screws are inserted loosely. The Brunite blade is placed between the old cutting blade and the bottom plate of the mower and is pressed back against the screws or bolts, which are then tightened. The set screws on the reel blades are adjusted to touch the Brunite blade lightly and evenly. The mower is then ready for use.

An Automatic Device for Controlling Delivery Rates of Reciprocating Pumps

Any reciprocating pump can be caused to deliver accurate predetermined quantities in a proportionate ratio to a variable rate of flow or in a given time period by applying to the standard pump a control mechanism recently developed by Proportioners, Inc., 737 North Michigan Avenue, Chicago, Ill. This Tret-O-Control consists of the Roto-Flo connected by valve control linkage to any reciprocating pump, and performs two classes of operations: proportioning of a secondary fluid under control of a primary flow; and rate of flow control of any fluid to be delivered at constant predetermined rates from any reciprocating pump.

The Roto-Flo is inserted in any pipe line conveying the controlling fluid to which the secondary or controlled fluid is to be added. This Roto-Flo feels the changes in the rate of through-put, and through a speed changer and gear box assembly registers the flow rate on a pilot valve, which admits any external sources of power such as compressed air or steam in impulses that are transferred through piping to the valve mechanism of the pump which is to measure, build up the pressure and deliver the secondary fluid. The operator can turn a simple adjusting screw which will increase or decrease the stroking rate of the secondary pump so as to inject larger or smaller percentages of the fluid. This operation is performed independently of changes in flow or pressure of the controlling fluid.

This method is useful in the blending of two or more fluids, and the addition of large quantities of reagent to a controlling liquid, and can be modified to handle ordinary rate of flow control problems. The rotor as well as the pump may be selected for the handling of viscous fluids, corrosive fluids and high temperature through-puts. The Roto-Flo is made in a variety of sizes for insertion in pipe lines from 1½ up to 12 inches and in each size offers very nominal pressure losses over a wide range of sensitivity. Tret-O-Control maintains a straightline relationship between through-put and pump discharge over flow ranges which may vary in most cases about 10 to 1 between the maximum and minimum through-put. The range of adjustment on the injected percentage of secondary fluid may be practically unlimited, as blends from a few parts per million to fifty-fifty may be accomplished easily by the selection of the proper sizes of Roto-Flo and reciprocating pump. Further interesting details can be secured from the manufacturers.



Clarence Bingham Joins Consulting Engineer Firm

Clarence A. Bingham, for the past eighteen years City Manager in several cities, has become a member of the Municipal Management & Research Co. This company, with offices in the Statler Building, Boston, and at 205 West Wacker Drive, Chicago is a subsidiary of Thompson & Lichtner Co., Inc., consulting engineers. The Municipal Management & Research Co. conducts municipal and state surveys, appraisals and reorganization systems, as well as supervising the proper management of governmental functions.

An Improved Sand and Stone Spreader

Improved models of the G. S. C. Hi-Speed spreader, the manufacture and sale of which have recently been taken over by the Syracuse Road Machinery Co., Syracuse, N. Y., have been announced by that company. This spreader, which is designed for use in road repair and maintenance, handles gravel, sand, cinders, crushed stone and calcium chloride at any speed and with an even spread.

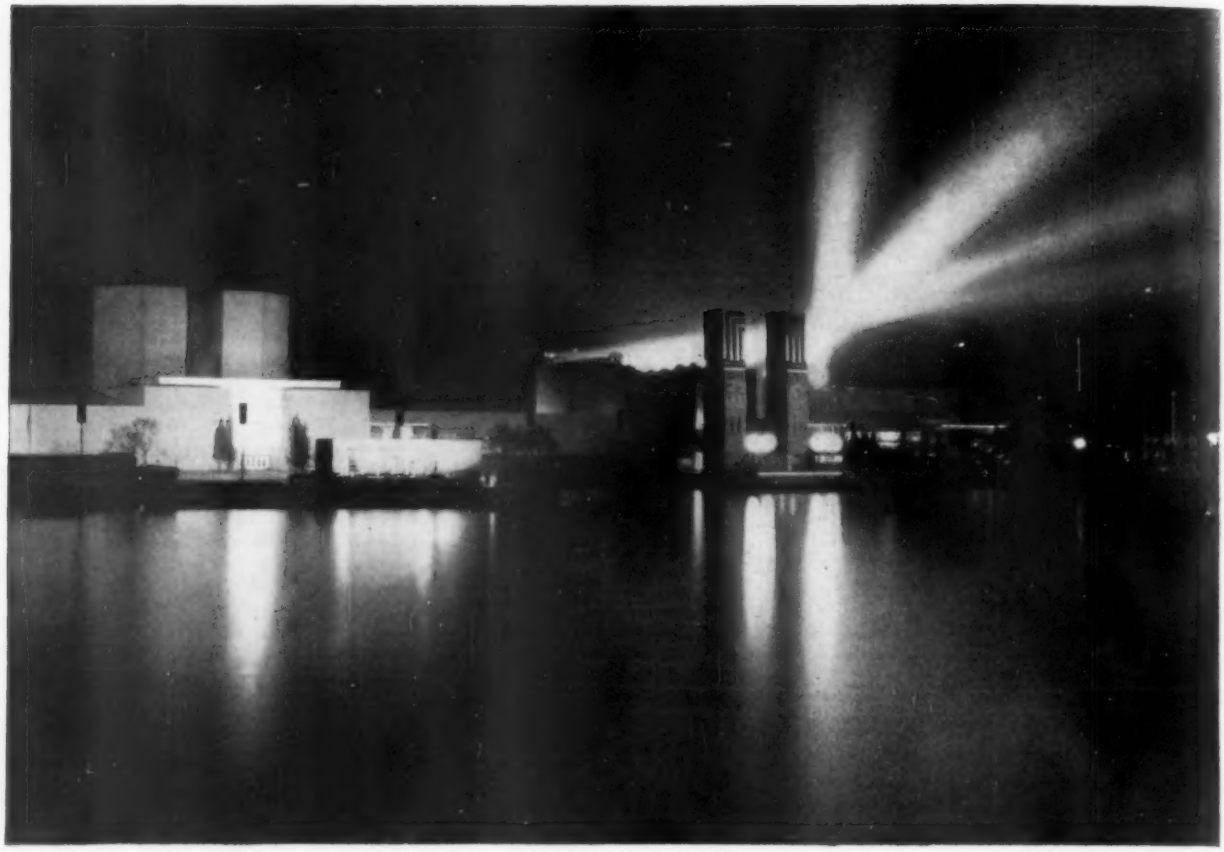
SYRACUSE HI-SPEED SAND AND STONE SPREADER

The unit can be completely attached or detached in a few minutes by one man. The width of the spread varies from 1 to 8 feet, and the depth ranges from a light sprinkle to several inches. The truck is operated either forward or backward with even spreading in either case. The power take-off assembly is universal to all truck wheels.

Sparling Opens New York Office

R. W. Sparling, manufacturer of main-line water measuring equipment, of Los Angeles, Calif., has announced the opening of a New York office at 101 Park Avenue, New York, where main-line water meters, service and engineering counsel are available at all times.

The Sparling exhibit at the Chicago convention of the American Water Works Association attracted the favorable attention of water-works superintendents from municipalities in all parts of the United States.



A Lesson for Every City

THERE'S a lesson for every city in the lighting of A Century of Progress. The lighting was carefully planned in a comprehensive way. Buildings, gardens, fountains, and grounds were lighted with a definite regard to architectural design and a harmonious continuity of night effect.

Every city, too, needs a coördinated lighting plan, for streets and for public buildings.

A progressive program for improved street lighting provides for future use of proper intensities without changes in distribution equipment; it makes possible the harmonious selection of luminaires and standards—an important daytime consideration; it provides for planned financing over a definite period of time.

Plans for the floodlighting of public buildings should always be included in the basic building design. When so included, lighting can be both beautiful and practical.

Whether your plans call for the lighting of streets, of parks, or of buildings, General Electric illuminating engineers can help you. If you wish to consult them, or desire more information about exterior lighting, write to General Electric, Dept. 6-201, Schenectady, N. Y.

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Highway Lighting by Sodium Vapor Lamps

A NEW kind of street light—the first radical departure in more than 30 years of conventional arc and incandescent lamps—has recently been turned on along a half-mile of highway on the Ballston Road near Schenectady, illuminating it with the characteristic orange-yellow glow of sodium vapor. Sponsored jointly by the General Electric Co. and the New York Power and Light Corporation, this is the American première of the sodium vapor lamp. This demonstration embodies the result of many years of research by General Electric physicists and engineers in Schenectady, Cleveland and Hoboken, as well as thorough studies of similar developments abroad. Twenty-two lighting units have been placed by the engineers, but not more than 18 will be lighted at any one time. They have been so installed that they can be shown in different spacing combinations of 125 and 250 feet for purposes of comparison.

Visual Sharpness Attained

Sodium light is monochromatic in character—that is, it glows in but one color, whereas daylight is made up of all colors. Monochromatic light is valuable in highway lighting, being especially useful in revealing the details of objects at low levels of illumination, although it has disadvantages in interior lighting where color discrimination is important. The monochromatic light of sodium falls in a region near the maximum sensitivity of the eye. The experimental set-up will determine whether this visual sharpness is an important factor in night driving. The most important advantage of sodium vapor lamps is their comparatively high efficiency. They can be manufactured with two to three times the efficiency of the tungsten filament incandescent lamp, and there are indications that even greater efficiencies will eventually be obtained.

DAYLIGHT VIEW OF THE SODIUM VAPOR LAMP TEST INSTALLATION, BALLSTON ROAD, SCHENECTADY, N. Y.

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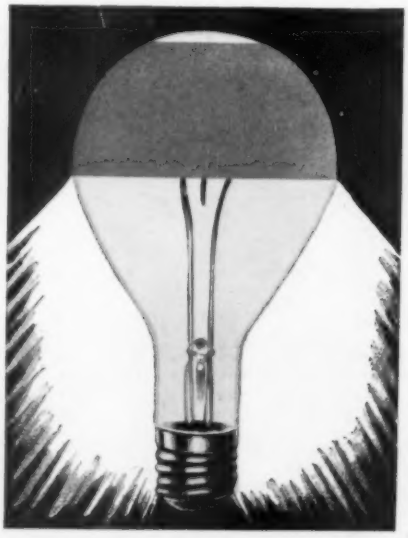
Solve the conflict between loss of income and safe street lighting.

It is not necessary to darken your city. Protect your homes and streets from crime and accident by using

The revolutionary new
Welsbach Silvray Processed Street Lamps

MORE LIGHT WITH THE SAME CURRENT



WELSBACH SILVRAY PROCESSED LAMP
Light rays toward the street
Protected by U. S. Letters Patent

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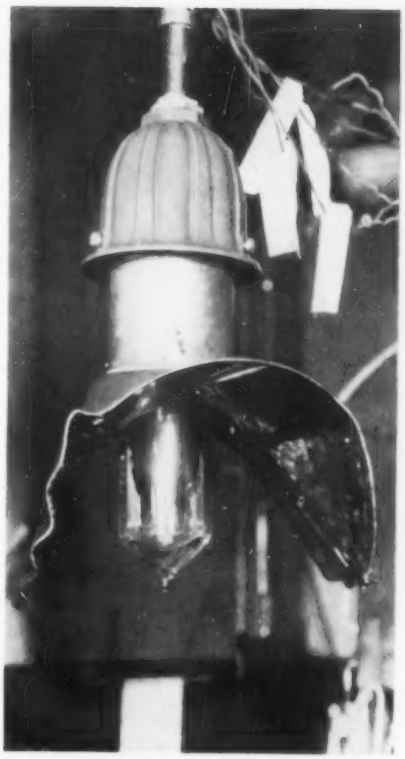
A New Effect

The new lamps are equipped with a special type of reflector, resembling a "floppy bonnet," but designed to put the light on the road rather than distribute it in all directions. Compared to incandescent lamps, in which a glowing filament, or "hairpin," is visible, the sodium lamps appear as solid globes of light. They were made for this installation by the General Electric Vapor Lamp Co., of Hoboken. The lights are turned on automatically when darkness falls by the G. E. Photoelectric control, commonly known as the "electric eye."

The arc in these lamps has the appearance of a neon discharge, quite red in color, when the current is first turned on. As the lamp warms up, owing to the heat from a heater element and the arc, and the pressure of the sodium increases, the light becomes yellow. At first glance the light from the new lamps seems markedly dim in comparison with regular incandescent or arc lamps. Actually, seeing is made easier on account of the reduced glare and the monochromatic quality of the light. Sodium lamps give for the same wattage input about two-and-a-half times the light output of the incandescent lamp. This fact, together with the improvement in vision under monochromatic light at low intensities, indicates a very great increase in visual efficiency over the present-day highway lighting systems, without an increase in current consumption. This will be partly offset by increased installation expense.

The new lamp itself is a gaseous discharge device, mounted inside a thermos bottle, to conserve heat and maintain the sodium at a temperature of about 480 degrees. It is 7 inches long and less than 3 inches in diameter, and fits closely inside the thermos bottle, which acts as a globe. The arc current is carried through the lamp by the gas itself, instead of by a filament. The lamp wattage is about 80 to 90 watts, and the light output about 4,000 lumens, which is the equivalent of the 400-candlepower Mazda lamp consuming 215 watts.

Preliminary demonstrations of the sodium lamp were made last fall by General Electric at its plant in Lynn, Mass., and before the Illuminating Engineering Society at Swampscott, Mass., but this is the first demonstration on a public highway. For the present the usefulness of the sodium lamp will possibly be confined to highway lighting, and to other outdoor lighting where color discrimination at night is of little importance. The performance of the lamps in the Schenectady installation will be closely watched by engineers of the General Electric Co. and the New York Power and Light Corporation, since the sodium lamp is a subject of national interest. It is expected that this lighting will be inspected by many central station and municipal engineers from other cities.



SODIUM VAPOR LUMINAIRE FOR BALLSTON ROAD INSTALLATION

BALLSTON ROAD, SCHENECTADY, LIGHTED BY SODIUM VAPOR LAMPS

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ILLUMINATION ADDS NIGHT-TIME FASCINATION TO PUBLIC PARKS

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